ADSL X6

U S E R G U I D E

NOTICE

Contents

Overview

This User Guide provides instructions for setting up your X6, connecting the X6 to wired and wireless computers on a network, and securing your network. There are also instructions for setting up the X6 for gaming.

For most customers, Chapter 1 covers what you need to get connected to the Internet. Chapter 2 applies if you want to set up a network. Chapter 3 provides security information, and Chapter 4 provides what you need for gaming.

Chapter 5 Advanced Setup is primarily for System Administrators. This chapter explains how to use advanced features of the X6 such as adding extra security with firewall filtering, backing up and restoring the X6 configuration, updating the X6 firmware, and creating a fixed IP address.

You can find new and updated information about the X6 at the Zoom Web site:

www.zoom.com/techsupport/adsl/adsl_x6.shtml

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Installation Instructions

This chapter covers the basic instructions needed to install your X6 and connect to the Internet. These instructions can be used by those with a Macintosh, Linux, or Windows operating system. Note: Windows users - . If you did not successfully set up the X6 using the ***Install Assistant****, follow these instructions to install the X6 manually. If you already installed and connected your X6 (using the separate Quick Start booklet provided for Windows users), you can skip this chapter and begin with Chapter 2.*

Package Contents

Your package contains the following items:

- Zoom ADSL X6 modem
- Ethernet cable
- Phone cord
- Power cube
- CD

The CD contains the installation software, documentation, warranty, and Customer Support information.

If anything is missing or damaged, please contact Zoom Customer Support or whoever sold you the modem.

In addition, the package may include:

- A splitter to enable you to use a single ADSL wall jack for both an Internet connection and for telephone service (certain countries only)
- Phone-jack adapter to adapt the phone cord to a particular phone jack (certain countries only)
- ADSL line filter(s) (certain models only)

Before You Begin

Before you begin installing the X6 modem using this guide, you must have the following available to you:

- ADSL service enabled on your telephone line. To do this, you need to sign up with an ADSL service provider. Once this service is enabled, you should have an ADSL-enabled telephone wall jack to plug the X6 modem into. (Your service provider may refer to ADSL service as DSL service).
- One or more computers or laptops that you want to connect to the Internet. The X6 supports Macintosh, Linux, and Windows 98/Me/2000/XP operating systems.
- Any computer or laptop that you want to connect without wires to your network. These must be equipped with a wireless adapter or have built-in wireless capabilities. The X6 supports 802.11b and 802.11g compatible adapters.
- Any computer that you want to physically connect to your X6 LAN port. The X6 has four LAN ports to which you can connect devices. A computer must have an Ethernet port to make these connections.
- Additional Ethernet cables. If you plan to connect more than one computer directly to the modem, you will need additional Ethernet cables to make the connection. The modem supports up to four direct connections with its four LAN ports.

Installing the X6

Installing the X6 involves four steps: **Installing the Software**, **Installing the Hardware**, **Establishing Communication**, and **Setting Up a Wired Network**.

Step 1: Installing the Software

Note:
This section is for Windows computer users who did not already run the **Install Assistant** on the CD. If you already ran the **Install Assistant** or are using a Macintosh or Linux computer, skip this section and begin with the next one, **Installing the Hardware**.

Regardless of how many computers you plan to use with the X6, you only have to install the software on one of them.

You will install the software on a Windows computer that you directly connect to the X6, and then use that computer to configure the modem. This computer must have an Ethernet port. If it does not, you can purchase an Ethernet card (sometimes called a Network Interface Card or NIC) to add an Ethernet port.

Important!
If possible, use a computer that is centrally located in your home or office and that has easy access to an ADSL line. A central location helps assure good wireless performance. If you do not have a desktop computer located centrally in your home (for example, it is in the basement), or you only have notebook computers, you should still directly connect this desktop computer or one of your notebooks to the X6 to configure it. Once the X6 is set up and your Internet connection is working, you can unplug the computer from the unit and move the X6 to a more central location.

Turn your computer on.

1 Insert the supplied CD into the CD drive of your computer. The CD should start automatically. (If the CD does not start automatically, on the desktop, click the **Start** button, click **Run**, and then type **D:\setup.exe**, where **D** is the letter of your CD drive.)

2 Follow the prompts to install the software. Click **Next** to bypass the screens for setting up the hardware.

Congratulations! You have installed the software. Now continue with the next section, **Step 2: Installing the Hardware**.

Step 2: Installing the Hardware

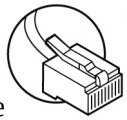
Windows users only: Be sure that you have already installed the software BEFORE beginning this section. Software installation is not required for Macintosh and Linux computers.

1 Shut down and power off your computer.

- For Windows users, this is the computer on which you just installed the software.
- For Macintosh or Linux users, this can be any one of the computers that you plan to use with the X6. In a typical situation, this would be the computer that is closest to your ADSL wall jack.

2 Rotate the antenna on the back of the modem to a vertical position.

3 Connect the modem to the computer's Ethernet port.

Plug one end of the Ethernet cable  into any one of the X6 modem's **LAN** ports (**LAN 1**, **LAN 2**, **LAN 3**, or **LAN 4**) and plug the other end into your computer's Ethernet port.

4 Plug the power cube into a power strip or wall outlet and then plug the power cube's other end into the modem's power (**PWR**) jack.

> **Important!**
> Only use the power cube shipped with the X6. Other power cubes may damage your hardware.

5 After you plug in the power cube, the **PWR** and **WLAN** lights on the front panel of the modem should become steady on, and the **LINK** light should blink. If the **PWR** light does not turn on, make sure there is power at the wall outlet or power strip where you plugged in the power cube.

6 Turn the computer on.

7 Plug one end of the supplied phone cord into the modem's **ADSL** port and the other into the ADSL wall jack. The blinking **LINK** light should become steady on. If it does not, refer to **Troubleshooting** on page 106.

> **Tip!**
> If your X6 came with an ADSL splitter, you can plug it into the ADSL wall jack. This enables you to use the wall jack for both your ADSL connection and for your telephone service. The splitter has two jacks, one labeled for your ADSL modem connection and the other for your phone.

8 **We recommend that you install a filter on every phone and fax machine that is sharing the ADSL phone line.** Otherwise these devices won't work properly when they're off-hook and will interfere with your ADSL connection. Do not, however, plug a filter between the wall jack and the X6.

You may have received ADSL phone filters with your X6. If you did not, or if you need more filters, they are available at most retail stores that carry consumer electronics.

For each filter, plug the phone or fax machine's cord into the filter's **PHONE** end and plug the filter's **LINE** end into the

wall jack. (Do not plug a filter between the wall jack and the X6.)

Congratulations! You have installed the hardware. Now continue with the next section **Step 3: Establishing Communication**.

Step 3: Establishing Communication

Important!
Macintosh and Linux users must make sure that the computer's TCP/IP settings are configured properly BEFORE starting this section. See **Macintosh TCP/IP Settings** on page 100 or **Linux TCP/IP Settings** on page 102 for instructions.

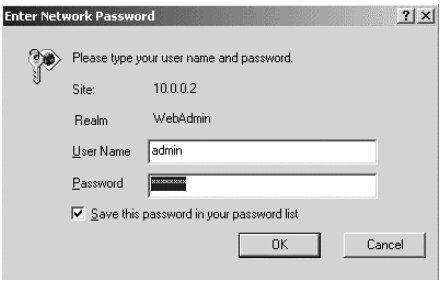
You must set up the X6 so that it can communicate with your Internet service provider. To do this, you must use the **Zoom Configuration Manager**.

1. Log into the **Zoom Configuration Manager** from the computer on which you installed the X6 software:

   a. Open your Web browser and, in its address bar, type **http://10.0.0.2** and then press the **Enter** key on your keyboard.

   Tip!
   If you are using a Windows computer, a **Zoom** icon should have been placed on your desktop automatically. Instead of typing the address above in your Web browser, you can double-click the **Zoom** icon.

b On the **Enter Network Password** dialog box, type the following user name and password in lowercase then click **OK**. (The **User Name** and **Password** you enter here are not the same as the User Name and Password that your Internet service provider may have given you.)
User Name: **admin**
Password: **zoomadsl**



If you are not prompted for a **User Name** and **Password,** do the following in this order: Recheck all connections; restart the modem and computer; and reset the modem by inserting a paper clip into the **Reset** pinhole in the modem's back panel and press it three times.

Tip:
If you want to choose your own password after the setup is completed, you can do so using the Advanced Features of the X6. See **Changing Your Password** on page **89**.

2 After you log in, use the **Basic Setup** page to configure the modem so it can connect with your Internet service provider.

Do the following:

a Enter your **Protocol**, **Encapsulation**, **VPI**, and **VCI** settings in the appropriate boxes. Your service provider should supply these values. If you do not know these settings, refer to the tables starting on page 93.

b **NAT** (Network Address Translation) is **Enabled** by default. This feature lets multiple users access the Internet sharing a single IP address. **Enabled** is typically the right setting. Select **Disable** in the unlikely event that you want to assign different public IP addresses to each network user.

C Depending on the **Protocol** setting you selected the bottom half of the page will change so that you can enter additional information.

- **If you selected PPPoA** or **PPPoE**, enter your **ADSL Username** and **Password** in the appropriate boxes. Your Internet service provider should have given this information to you. (Your Username is typically your email address or the characters preceding the @ sign in your email address. This is NOT the same Username and Password that you used earlier to open the **Zoom Configuration Manager**.)
- **If you selected 1483 Bridged** or **1483 Routed**, you have the option of using either dynamic or static IP addressing. Depending on your situation, select the appropriate option button:
  - [MOST USERS] Ensure that **Obtain an IP address Automatically** is selected if you are using Dynamic Host Configuration Protocol (also known as DHCP or dynamic IP addressing). This option is selected by default because most Internet service providers use DHCP.
  - Select **Use the following IP Address** only if you are using a static IP address. (You should know if you are using static IP addressing. There is typically an extra charge for a static IP address and you usually have to make special arrangements with your Internet service provider to get one.)

    Then **enter** the **IP Address**, **Subnet Mask**, **Default Gateway**, and **DNS** that you plan to use. Click the **Save Changes** button, then click the **Write Settings to Flash** button.

3 Verify that you Internet connection is working. Open your Web browser (for instance, Internet Explorer or Netscape Navigator) and try to connect to a familiar Web address. If you connect successfully, you are ready to set up the rest of your network.

(If you do not connect, see **Appendix D** on page 106).

Tip!
If you configured the X6 using a notebook computer, you can keep it plugged in or you can disconnect it from the unit's **LAN** port. As long as the X6 remains plugged into an ADSL wall jack and a power source, the X6 can function as a stand-alone device. You can then make the notebook part of your wireless network.

Congratulations! You have established communication and your computer is now connected to the Internet. Now continue with **Step 4: Setting Up a Wired or Wireless Network**.

Step 4: Setting Up a Wired or Wireless Network

Once a computer that is directly connected to the X6 modem is able to browse the Web, you know for certain that your Web connection is working. Now you can set up the rest of your network.

It is up to you whether you want to have some computers connected directly to the X6 and others connected wirelessly. The X6 supports both wired and wireless connections. You can have up to 253 connections, four of which can be wired directly through the X6's four **LAN** ports. You can also plug a network device (such as a hub, switch, or router) into one of the **LAN** ports.

To set up your network, you can do any or all of the following, in any order that you choose:

- If you want to connect additional computers directly to the X6, see **To Connect Additional Wired Computers** below.
- If you want to connect a hub, switch, or router directly to the X6, see **To Connect a Network Device** on page 18.
- If you want to connect additional computers using a wireless network, see **Setting Up Your Wireless Network** on page 20.

To Connect Additional Wired Computers

You can connect up to four computers that have Ethernet ports directly to the X6.

1. Shut down and power off the computer you want to connect to the X6. (This is important because the computer must locate the correct IP address for the modem. This is done when the computer is turned back on in step 3 below.)

2. Plug one end of an Ethernet cable into one of the modem's LAN ports and plug the other end into the computer's Ethernet port.

3 Turn on the computer.

4 Verify that your Internet connection is working. Open your Web browser (for instance, Internet Explorer or Netscape Navigator) and try to connect to a familiar Web address.

5 Repeat steps 1–4 for each computer you want to add.

To Connect a Network Device

You can use one of the **LAN** ports on the X6 to plug in a network device (for example, a hub, switch, or router).

1 Plug one end of an Ethernet cable into one of the modem's **LAN** ports and the other end into the network device's Ethernet port. (For a hub or a switch, this is typically called an **Uplink** or **Expansion port**. For a router, this is typically called a **WAN port**.)

2 Set up your network. Refer to the documentation provided with your particular network device for instructions on how to do this.

3 Once your network is set up, reboot any computer that is part of the network.

4 Verify that your Internet connection is working. Open the Web browser (for instance, Internet Explorer or Netscape Navigator) on each computer and try to connect to a familiar Web address.

Congratulations! You have set up your wired devices. If you have wireless devices that you want to add to your network, go to **Setting Up Your Wireless Network** on page 20.

Universal Plug and Play

The X6 supports Universal Plug and Play (UPnP™). This means that other devices plugged into your computer or network (for example, a gaming application, router, or stand-alone firewall) that use UPnP should automatically detect the X6 and make the needed configurations for them to work together. There is no setup for you to do.

If You Need Help

Zoom has many Technical Support services available to its customers. You can access these services in a variety of ways:

- Windows users: Insert the CD, select your language, and then click the Customer Support link to view comprehensive support information.
- Macintosh and Linux users: Insert the CD and navigate to the Mac_Linux folder to view documentation and support information.
- Visit our Web site at **www.zoom.com** and select **Technical Support**. From there, you can send email to our technical support experts or do a smart search through our **SmartFacts™** database.

> **Tip:**
> From time to time, Zoom may release improved firmware. This is also available at **www.zoom.com**, along with upgrade instructions. We recommend that you check our Web site periodically for updates.

- Call our support office in the United States at (561) 241-7170 or in the United Kingdom at 44 0870 720 0090.
- Some retailers of Zoom products provide support or can recommend a convenient support center.

2

Setting Up Your Wireless Network

This chapter discusses how to set up a wireless network using wireless adapters and/or computers that have built-in wireless capabilities. Chapter 3 provides information about implementing network security.

Note that for **each** computer added to your wireless network, you will need to take appropriate steps for setting up that computer. To do that, select one of the three possibilities for that computer below:

1. Some newer Windows XP notebooks and desktops have built-in wireless networking capabilities and do not require the installation of a wireless component. If this is the case, you should set up that computer's wireless connection using Windows XP. See **Connecting a Windows XP Computer with Built-in Wireless Capabilities**.

   Tip!
   To see if your notebook has built-in wireless capabilities: On the Windows desktop, click **Start**, click **Connect to**, and then locate the **Wireless Network Connection** option. If **Connect to** does not appear, or if there is no **Wireless Network Connection** option, then your notebook does not have wireless capabilities.

2. Some desktop and notebook computers may have built-in wireless networking capabilities, but do not use Windows XP. If this is so, set up your computer's wireless connection using **Connecting a Wireless-enabled Computer to the X6** on page **21**.

3. Some desktop and notebook computers may need a wireless network adapter installed. This can be a USB adapter, PC Card adapter, or PCI adapter. When you install the adapter, make sure that it is set to **infrastructure** or **access point** mode (NOT **ad-hoc** or **peer-to-peer** mode). If you need help installing your wireless adapter or setting its mode, refer to the documentation that came with it. After you install the adapter, see **Connecting a Wireless-enabled Computer to the X6**.

Connecting a Wireless-enabled Computer to the X6

1 Go to the wireless-enabled computer that you want to add to the network. The computer should have software that will let it perform a **site search** to scan for available wireless networks in your area. When the **SSID** (Service Set Identifier) of your X6 wireless network appears in the list—the SSID is **zoom**—select it as the network you want to use to connect to the Internet.

Tip!
For most wireless adapters, you will use its wireless configuration manager software and click a **Scan** button or select a **Site Scan**, **Scan Networks**, or other similarly named tab to do a site search. If you need help, refer to the documentation that came with your wireless adapter.

There are several site scan issues you should be aware of:

- If you installed a wireless adapter on a Windows XP computer, Windows XP may try to automatically configure the adapter (rather than let you use the software provided with the wireless adapter). You will know this is happening because you will be prompted with a message about one or more wireless networks being available. You will also be able to click a link to open the **Wireless Network Connection Properties** dialog box. If this happens, click the link, and clear the **Use Windows to configure my wireless network settings** check box then click **OK**. You can then use the software provided with your wireless adapter without interruption from Windows XP.
- More than one wireless network may appear in the list. These are other wireless networks that are within range of your network. Your neighbors for instance may be within range of your network. Each wireless network has a channel associated with it. We recommend there be at least a five-channel difference between your network and those of your neighbors. Having less than a five-channel difference may result in interference with your connection. By default, the X6 uses channel 10. If you need to change this channel, you must do so using the **Wireless Setup** page of the **Zoom Configuration Manager**.
- If you want to secure your wireless network so it won't be accessible by others, you should specify security settings. To learn how, see **Setting Wireless Security** on page 26. (By default, the wireless connections provided by the X6 do not have any security applied.)

2 Test your wireless connections. From each desktop or notebook computer that you set up, open your Web browser (for instance, Internet Explorer or Netscape Navigator) and try to connect to a familiar Web address.

If you connect successfully, you are ready to browse the Web!

Important!
If you want to add security to your network, see **Setting Wireless Security** on page 26.

Connecting a Windows XP Computer with Built-in Wireless Capabilities

This section applies to Windows XP notebooks and computers that have built-in wireless capabilities.

1. On your Windows desktop, click the **Start** button then click **Control Panel**.

2. **Double-click** the **Network Connections** icon.

3. **Right-click** the **Wireless Network Connection** icon, then select **Properties**.

4. On the **Wireless Network Connection Properties** dialog box, select the **Wireless Networks** tab. Windows XP will automatically scan for available wireless networks in your area. Any compatible networks within range will appear in the **Available networks** list. It should find the wireless network of the X6—named **zoom**. (The scan is done automatically because the **Use Windows to configure my wireless network settings** check box is selected by default).

5. Select **zoom** from the **Available networks** list, then click the **Configure** button to add it to the **Preferred networks** list. The notebook will try to connect to the Internet using the wireless networks listed here, in the order in which they appear. (If you already have networks listed here, we recommend you either remove them or use the **Move up** button to move **zoom** to the top of the list.)

6. Click **OK**.

7 Test your wireless connection. From the computer or notebook that you set up, open your Web browser (for instance, Internet Explorer or Netscape Navigator) and try to connect to a familiar Web address.

If you connect successfully, your notebook's wireless capability is configured and you are ready to browse the Web!

Important!
If you want to add security to your network, please see **Setting Wireless Security** on page 26.

Checking Your Settings

If you ever need to check your wireless settings, you can do so from the **Wireless Setup** page. This page is available in the **Zoom Configuration Manager** by clicking the **Wireless** icon.

The table below explains the settings:

This setting…	Lets you specify…
Wireless Status	**Enable** shows that your wireless network is up. **Disable** indicates that your wireless network is down.
SSID	The Service Set Identifier for your wireless network. By default, the SSID for the X6 is **zoom**. You can change the SSID to any name that you want.
Default Channel	The channel your wireless connection uses by default for your wireless connection. The X6 comes set for channel **10**.
Profile	The standard used by your wireless adapters. This drop-down list contains **802.11b Only**, **802.11g Only**, or **Mixed Mode**. The default is **Mixed Mode**, which allows you to mix both **b** and **g** wireless adapters.
Encryption	The type of encryption used for your wireless Internet signal. This drop-down list contains **None**, **WEP-64 bit**, **WEP 128 bit**, and **WPA**. The default is **None**, meaning that no security is enabled.
Country	If your country is not listed, select **Other.**

3

Setting Wireless Security

When you first set up your X6 wireless network, security is turned off by default. This means that your wireless signal is not encrypted and that anyone with compatible wireless technology can access your computer network and the Internet using your wireless connection. This chapter explains how to set up wireless security to protect your network and Internet connection.

Overview

To set up wireless security, you will create and enter a unique passphrase or an alphanumeric key. Once entered, only devices with the proper key or passphrase will be allowed to establish a connection to the network.

There are two ways to configure and implement a passphrase or key. They are referred to as **WPA** (WiFi Protected Access, sometimes called **WPA** Shared Key) and **WEP** (Wired Equivalent Privacy) 64 and 128 bit). WPA is better, but you can only use it if all your wireless devices support WPA.

You can check to see if all other clients that you plan to put on the network support WPA or WPA Shared Key**.** You can do this by checking the manual that came with each device or by checking the configuration software for the installed device. Look under **Security** or **Encryption** or **Setup** or **Advanced Features**. If all the clients support WPA, proceed with **Setting Up Security Using WPA or WPA Shared Key**. If they do not, skip to **Setting Up Security Using WEP**.

Setting Up Security Using WPA or WPA Shared Key

WPA uses a **passphrase** that you choose and enter on the X6 and other wireless devices on the network (clients) to set up security. To use WPA, **all** of the wireless devices on your network must support WPA.

1 Check to see that all other clients that you plan to put on the network support WPA or WPA Shared Key**.** If they do not, skip to **Setting Up Security Using WEP**.

2 Click the **Wireless** icon in the **Zoom Configuration Manager**. This will open the **Wireless Setup** page. Go to **Encryption** (which should say None) and select **WPA** from the drop-down menu. A new fill-in box labeled **WPA Passphrase** will open directly below the **Encryption** box.

3 Choose and enter a **Passphrase**. You can enter a word or phrase, or for greater security you can enter a combination of numbers and letters. The Passphrase is case-sensitive and can be up to 8 characters.

4 Every wireless network client needs to be set individually by entering the **Passphrase** on all wireless devices on the network. Open the software that came with the device, which should be running on the computer where the device is installed. Find the configuration menu for security, choose **WPA**, and enter the **Passphrase**, exactly as you entered it on the X6 **Wireless Setup** page.

Your security setup configuration is now complete!

Setting Up Security Using WEP

If **all** of your network devices DO NOT support WPA, you can use WEP to configure network security. WEP can be configured two ways: 64-bit and 128-bit. 128-bit WEP provides a bit more security than 64-bit, but 128-bit WEP also tends to diminish network performance. We recommend that most people configure their WEP for 64-bit security.

1 **Click** the **Wireless** icon in the **Zoom Configuration Manager**. This will open the **Wireless Setup** page. Go to **Encryption** (which should say None) and select **WEP-64 bit** (**or WEP-128** bit for more security, but diminished network performance) from the drop-down menu. Six new boxes open directly below the **Encryption** box.

2 **Check** the box marked **Passphrase** and then choose and enter a **Passphrase**. You can enter a word or a phrase, or for greater security you can enter a combination of numbers and letters. The Passphrase is case-sensitive and can be up to 8 characters.

If **ALL**of the wireless devices (clients) on the network are **Zoom devices**, go to **step 3**. If **some or all** or the devices **are not Zoom devices**, go to **step 4**.

3 **If ALL of the wireless devices (clients) on the network are Zoom devices**, you need to enter the **Passphrase** that you just entered for each device.

Every wireless network client needs to be set individually. Open the software that came with the device, which should be running on the computer where the device is installed. Find the configuration menu for security, choose **WEP**, and enter the **Passphrase**, exactly as you entered it on the X6 **Wireless Setup** page.

Your security setup configuration is now complete!

4 **If any or all of the other wireless devices on the network (clients) are not Zoom devices**, you will enter one of the keys shown below the Passphrase on each client. You must enter the same key for each device. The key that you must use is the key corresponding to the **Default Key** number shown. If the number in the default key box is 1, use Key 1, and so on. You can choose the default key you prefer using the pull-down **Default Key** menu box.

Now that you have a key, enter it for each client. Every wireless network client needs to be set individually. Open the software that came with the device, which should be running on the computer where the device is installed. Find the configuration menu for security, choose **WEP** (**64-bit or 128-bit** depending on what you selected), and enter the **Default Key**, exactly as it appears on the X6 **Wireless Setup** page.

Your security setup configuration is now complete!

4

The X6 and Online Gaming

This chapter covers the set up of the X6 for online gaming with a desktop, notebook, Xbox® Live, or Playstation® 2.

Do I Need to Do Anything?

There are three cases where you need to set up your modem in order to play online games:

- If you are using your computer to play a peer-to-peer or head-to-head game over the Internet, you always have to set up the modem unless you linked up to your partner by going to a Web site. A peer-to-peer game is a game where two players are competing directly against one another. Popular peer-to-peer games include **Age of Empires**, **Command and Conquer**, **Dark Reign 2**, and **Unreal Tournament**. If you are unsure whether your game is a peer-to-peer game, check the game instructions.
- If you are using your computer to play a multi-player game **and** you want to host the game. Popular multi-player games include **Half Life**, **Diablo II**, **Delta Force**, **Hexen II**, **Myth**, **Quake II**, and **Warcraft II**, **III**.
- If you are playing an online game using Xbox® Live or PlayStation® 2.

  In all three cases you will need to do the steps described in the next section, **Setting Up the X6 for Online Gaming**.

Setting Up the X6 for Online Gaming

Setting up the X6 for online gaming involves two basic steps: **Choosing an IP Address for Gaming** and **Setting Up a Virtual Server or DMZ.** This section provides instructions for doing these tasks on your computer, Xbox®, or Playstation® 2.

Step 1: Choosing an IP Address for Gaming

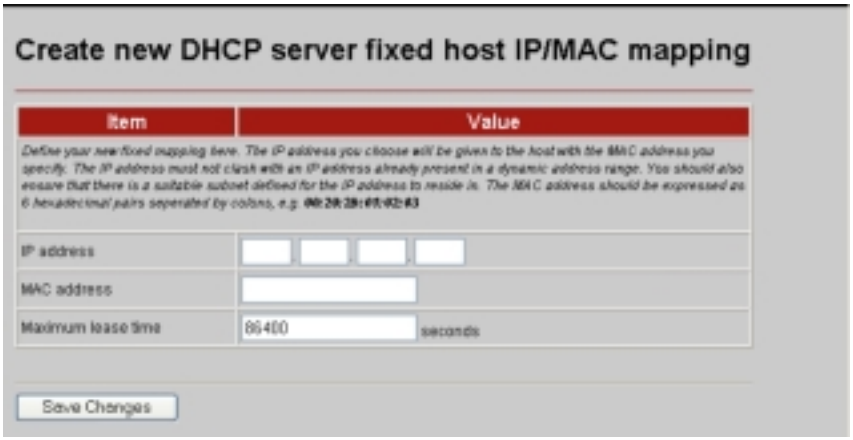
You need to make sure that the computer or gaming system you use for playing games always has the same IP address. By default, the X6 assigns addresses dynamically (using **D**ynamic **H**ost **C**onfiguration **P**rotocol or DHCP) to the devices on the local area network whenever they reboot. Therefore, the addresses won't necessarily always be the same. The modem, however, can be set up to assign the same address to your computer or gaming system every time.

To ensure that your computer or gaming system always uses the same address, follow the steps below.

1. If you are using Xbox or PlayStation 2, connect the device to your modem with an Ethernet cable. On your TV screen, locate **Network Settings** and select **Connect**.

2. Click the **Advanced Setup** icon in the **Zoom Configuration Manager**.

3 On the **Advanced Setup** page, click the **LAN Configuration** button. Next click the **Add DHCP Fixed Host** button. The **Create New DHCP Server Fixed Host** page appears:



4 Before you can enter an IP address, you need to enter the MAC (**M**edia **A**ccess **C**ontrol) address of your computer or gaming system. Follow the next set of instructions for your gaming system to find the gaming system's MAC address.

If you are using a computer to play an online game:

- If you know the name of your computer or if you have only one computer connected, you can find the MAC address under **DHCP Clients** at the bottom of the **Create New DHCP Server Fixed Host** page. You can also find the MAC address on the **System Status** page. Click the **System Status** icon and scroll down until you see **DHCP Client Status**.
- If you do not know the name of your computer or you have more than one computer connected, follow these steps to find the MAC address:

  a. Go to the computer you want to use for gaming.

  b. Click the **Start** button and select **Run**.

  c. In the **Run** dialog box, type **command** and click **OK** to open the **Command** or **MS-DOS** window.

  d. In the **Command Prompt** or **MS-DOS** window (after C:\> or C:\WINDOWS>), type **ipconfig**, leave a space, then type **/all**

     It should look like this: **ipconfig /all**

  e. Press **Enter**. The MAC address is displayed as the 12-digit **Physical Address** or **Internet Adapter** address. Go to **Step 5**.

If you are using Xbox® Live to play an online game:

a. You can find the MAC address on the Xbox Dashboard in the lower right corner of the **Network Settings** menu. You will see something like MAC=0050F24ADC29. Your address will be different. You will also need to assign an **IP address** now. To do this, on the **Xbox Network Settings** menu select **IP Addresses**.

b. On the **IP Addresses** screen, enter the following:

Configuration	Manual
IP Address	10.0.0.50
Subnet Mask	255.255.255.0
Gateway	10.0.0.2

c. Press **B** to go back to the **Network Settings** menu.

d. On the **Network Settings** menu, select **DNS Servers**.

e. On the **DNS Servers** screen, enter the following:

Configuration	Manual
Primary DNS	10.0.0.2
Alternate DNS	10.0.0.2

f. Press **B** twice to return to the main menu. Then go to **Step 5**.

If you are using PlayStation® 2 to play an online game:

a. Insert your Network Access Disc into the PlayStation.

b. On the main menu, select **ISP Setup**, then **I have an ISP**, then **Automatic Configuration**.

c. On the **Select an Internet service provider** menu, select **Other**.

d. On the **Connection Test** menu, select **Advanced**. The MAC address is displayed on the **Advanced Broadband Settings** screen.

e. Now, to configure the Playstation 2's network settings, on the main menu select **ISP Setup** again. If a message displays, press **X** to disconnect from the Internet.

f. On the **Edit Network Setting** menu, select **New Network Setting**.

g. On the **Connect to the Internet** menu, select **Local Area Network**.

h. On the **Local Area Network Setup** menu, select **Automatic Configuration**.

i. On the **Connection Test** menu, select **Test Settings**.

j. At the **Test for connecting to your ISP was successful** message, select **Continue**. Then follow the instructions to save your settings and return to the main menu. Now go to **Step 5**.

5 Now that you have determined the MAC address, you can assign your computer or gaming system an **IP address**. On the **Create New DHCP Server Fixed Host** page, make these entries:

Setting	Values
IP Address	Enter **10.0.0.50**. If you are setting up more than one computer or gaming system, you should use different IP addresses. For example, if you are setting up a Xbox and a computer, enter **10.0.0.50** for the Xbox, and **10.0.0.51** for the computer.
MAC Address	Type the MAC address from **Step 4**.
Maximum Lease Time	Leave the default setting.

6 Click **Save Changes** and then **Write Setting to Flash** to save the IP address to permanent memory. Now your computer or gaming system will always be assigned this address.

Step 2: Setting Up a Virtual Server or DMZ

You set up either a virtual server or a DMZ (Demilitarized Zone) so that the modem's firewall won't block the other players from your system during your gaming. The main difference between the virtual server and the DMZ is the amount of access someone has to your system.

A virtual server will allow access to your computer on certain ports. A port is like a channel that is used by applications (such as games) to communicate on. For example, the directions for the game you want to play over the Internet might tell you to open up port 6000.

A DMZ differs from a virtual server in that it allows access on all ports to the computer. Because of this, DMZ's are less secure than virtual servers and should be used with caution on your computer. For Xbox® Live and Playstation®2, a DMZ is OK since security is not as much of an issue as it is for your computer.

- If you are playing a **peer-to-peer** or **multi-player game** on your computer, go to **Setting Up a Virtual Server or DMZ on Your Computer** on page 39.
- If you are using Xbox Live, go to **Setting Up a DMZ on a Xbox® Live** page 41.
- If you are using Playstation 2, go to **Setting Up a DMZ on a Playstation® 2** on page 43.

Setting Up a Virtual Server or DMZ on Your Computer

Note:
If you have third-party firewall software, such as the Windows XP firewall, installed on your computer, you may need to deactivate it before setting up the virtual server or DMZ. Otherwise your computer may block the ports you want to open.

1 Click the **Advanced Setup** icon. Then, click the **Virtual Server / DMZ** button:

2 On the **Virtual Server / DMZ** page, click the **Add Virtual Server / DMZ** link to display the **Add Virtual Server / DMZ** page:

3 Make the following entries:

Setting	Values
IP Address	Enter the **IP address** that you specified on the **Create New DHCP Fixed Host Server** page.
Transport Type (Protocol)	**If you know your protocol (udp** or **tcp)** and port number(s) from your game instructions, select the protocol from the list. **If you do not know your protocol or port number(s)**, you need to set up your computer as a DMZ by selecting **DMZ** from the **Protocol** list. This will open up all ports on the computer to all communication over the Internet. **Warning**: Setting up a DMZ removes the protection provided by the ADSL Ethernet's firewall. We therefore recommend that a DMZ be used only when necessary.
Ports	**If you designated your computer as a DMZ**, you do not have to enter anything here. **If you are playing another peer-to-peer or multi-player game**, your game instructions should tell you what ports to enter here. To enter a number, you must enter **tcp** or **udp** in the **Protocol** box. If you need to enter multiple ports, add a new virtual server for each port. If you have several ports to enter, you may wish to set up your PC as a DMZ. The highest supported port number is 65535.

4 Click **Save Changes** and then **Write Settings to Flash**.

Your set up is complete!

Setting Up a DMZ on a Xbox® Live

1 Click the **Advanced Setup** icon. Then, click the **Virtual Server / DMZ** button:

2 On the **Virtual Server / DMZ** page, click the **Add Virtual Server / DMZ** link to display the **Add Virtual Server / DMZ** page:

3 Make the following entries:

Setting	Values
IP Address	Enter the IP address that you specified on the **Create New DHCP Fixed Host Server** page.
Transport Type (Protocol)	Select **DMZ** to enable your Xbox as a DMZ.
Ports	The field remains unavailable because you selected DMZ. No entry is required.

4 Click **Save Changes** and then **Write Settings to Flash**.

5 **Update the Xbox Dashboard:**
Make sure you have your Xbox Live Starter Kit at hand. Insert the Xbox Live CD into your Xbox. Once the update is complete, the main menu will include a **Xbox Live** entry.

6 **Insert the Xbox Communicator module into the Xbox Controller expansion slot (top slot)**. Then insert the headset plug into the Communicator module.

7 **Activate your Xbox Live account:**
The Xbox Live CD should still be in your Xbox. We recommend that you watch a video that explains the installation process: Select **Xbox Live** from the menu. Then from the **Dashboard**, select **Xbox Live** and follow the prompts. Note: You will need your subscription code to activate your account—this number is located on the CD's sleeve. (If you require more detailed instructions, please refer to your **Xbox Live** documentation.)

Your setup is complete!

Setting Up a DMZ on a Playstation® 2

1 Click the **Advanced Setup** icon. Then, click the **Virtual Server / DMZ** button:

2 On the **Virtual Server / DMZ** page, click the **Add Virtual Server / DMZ** link to display the **Add Virtual Server / DMZ** page:

3 Make the following entries:

Setting	Values
Internal IP Address	Enter the IP address that you specified on the **Create New DHCP Fixed Host Server** page.
Transport Type (Protocol)	Select **DMZ** to enable your Playstation as a DMZ.
Ports	The field remains unavailable because you selected DMZ.

4 Click **Save Changes** and then **Write Settings to Flash**.

Your setup is complete!

5

Using Advanced Setup

Advanced Setup is primarily for technically advanced users. For most people, the options that are set by default when the X6 is installed are sufficient.

*However, those who want or need to change the X6 settings can do so using the **Advanced Setup** page in the **Zoom Configuration Manager**. This chapter explains the advanced options and features of the X6 modem and how to apply them to your network.*

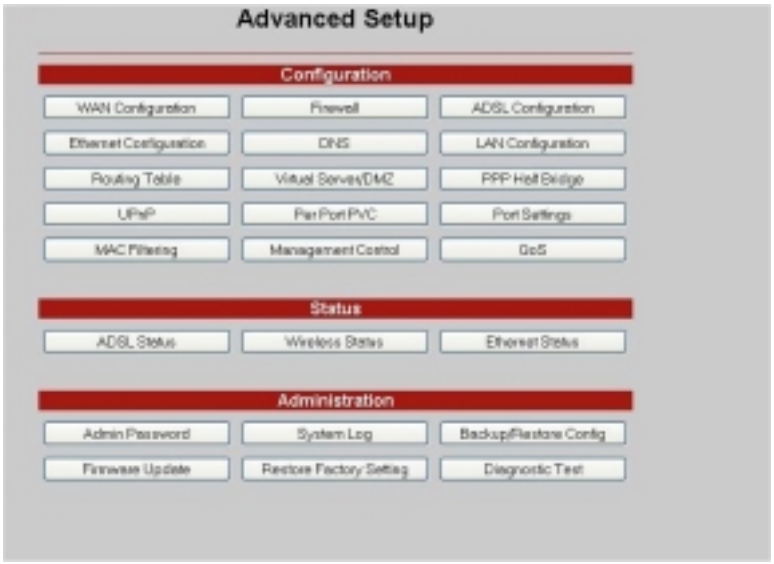
The information in this chapter applies to you if:

- *Your Internet service provider instructs you to enable, disable, or change the default settings for your X6*
- *You need to change your Wide Area Network settings*
- *You want to change the default firewall settings to block particular IP addresses and intrusive hosts*
- *You want to change your ADSL password*
- *You have customized your configuration and want to back it up for future use or apply it to additional modems*
- *You want to set up fixed IP addresses for your computer(s)*

Note: Users who want to set up Quality of Service (described in this section) can do so more easily using the Zoom Install Assistant.

Viewing the Advanced Setup Options

You open the **Advanced Setup** page by clicking the **Advanced Setup** icon at the top of the **Zoom Configuration Manager**. The page opens and displays buttons organized into three groups: **Configuration**, **Status**, and **Administration**:



Configuration Options

When you click a **Configuration** button, a page opens to the option you selected. The following table describes each option and the tasks you can perform.

This button…	Opens a page that lets you…
WAN Configuration	Specify how the Wide Area Network (WAN) ADSL setup is configured. Some of the values need to be supplied by your ISP/DSL provider.

This button…	Opens a page that lets you…
Firewall	Define an additional layer of security for the computers in your network. For example, if you create a DMZ interface using the **Virtual Server/DMZ** page (see below), you can enable the firewall filtering and add a security policy that blocks certain protocols from reaching the DMZ machine.
ADSL Configuration	Adjust the ADSL settings on your modem. Typically, you do not need to change these ADSL settings unless instructed by your service provider.
Ethernet Configuration	View and change the settings on the Ethernet ports on your X6. Typically you should not need to change these settings.
DNS	Allows you to specify multiple DNS servers. Typically, most users do not need to enter a DNS server unless instructed by their ISP.
LAN Configuration	Specify the settings that control the connection between the X6 modem and your Ethernet jack. Set a fixed IP address for your computer.
Routing Table	Set up the routes on which you want the X6 to send data that it receives on a particular interface, such as a LAN or Ethernet interface. Routes specify the IP address of the next device, interface, or Internet destination to forward data to, based on the ultimate destination of the data.
Virtual Server/DMZ	Open access to your computer by creating a virtual server or a DMZ (Demilitarized Zone). By default, your modem uses NAT (Network Address Translation) to hide your networked computers from users on the Internet. However, there are times when you may want to give outside access to the computers in your network. If so, you can set up a virtual server or DMZ to allow outside users access to a computer on your network. You may want to allow access, for example, if a LAN computer is hosting Internet games or running a Web server.

This button…	Opens a page that lets you…
PPP Half Bridge	Share the public IP address assigned by your ISP with a single PC on the LAN. This avoids problems caused by certain applications having to work through NAT (such as online games or FTP servers) and avoids the need to run a PPP software stack on the PC.
UPnP (**U**niversal **P**lug a**n**d **P**lay)	Connect automatically with other UPnP-enabled software and hardware. The **Internet Gateway Device** (**IGD**) protocol makes it possible for applications running on the network to automatically configure NAT routing.
Per Port PVC	Assign a LAN port to a **P**ermanent **V**irtual **C**ircuit (PVC). This feature is commonly used for delivering video.
Port Settings	Conveniently change the default port settings. You will need to use this feature if the X6 is hosting a web server or a Telnet server.
MAC Filtering	Prevent network devices with the specified MAC addresses from accessing the Internet.
Management Control	Enable or deny access to X6 services – HTTP, Telnet, UPnP, SNMP, TFTP – to local network devices and/or remote users.
QoS (Quality of Service)	Assign each port (LAN ports 1-4 and the wireless port) a priority of High or Medium. This lets you assure better performance for gaming and VoIP, for example.

Status Options

The **Status** buttons open reports that provide real-time information about your connections and networks. The reports refresh themselves to give you the most current information.

Typically, these reports are used for maintenance purposes and troubleshooting.

The following table describes each report in the **Status** group:

This button…	Opens a page that lets you…
ADSL Status	View information, such as the ADSL Line State, and Upstream and Downstream speeds.
Wireless Status	View information, such as your Link Speed, SSID, Default Channel, and Mac Address of your wireless computer.
Ethernet Status	View information about Rx (Receive) and Tx (Transmit) Packets.

To see sample reports, go to page 86.

Administration Options

The buttons in the **Administration** group are typically used for administrative tasks, such as updating the modem's firmware, changing your **Zoom Configuration Manager** password, putting back your modem's configuration file.

The following table lists each button in the **Administration** group and gives a brief description of the things that you can do with that feature.

This button…	Opens a page that lets you…
Admin Password	Change the password to the **Zoom Configuration Manager**. The original user name and password are: User name: **admin** Password: **zoomadsl**
Firmware Update	Specify the path to the upgrade file you need to update your firmware. Use the **Browse** button on this page to navigate to the file, then click the **Upload** button to perform the firmware update.
System Log	View data generated or acquired by routine system communication with other devices. This information does not necessarily represent unexpected or improper functioning and is not captured by the system traps that create alarms. You can save the system log to a file.

Restore Factory Settings	Reboot the X6 and reset its configuration to the factory defaults.
Backup/Restore Config	Save your current configuration settings so that they may be restored at a later time.

Using the WAN Configuration Settings

When do I need the WAN Configuration page?

The **WAN Configuration** page contains critical information about your Wide Area Network (WAN), ADSL setup, and Internet access. Some of these values are provided by your ISP/DSL provider and need to be entered on this page. To determine if you need to add other values, read the table descriptions that follow the picture. Note that **Protocol**, **Encapsulation**, **VPI**, **VCI**, **PPP**, and **NAT** also appear on the **Basic Setup** page. Most likely you have already entered values for these settings and only need the WAN Configuration page for setting up an advanced feature such as enabling a disconnect timeout on your PPP connection.

WAN Configuration page

The table on the next page describes the settings on the **WAN Configuration** page and the values that you can enter. After you enter your values, click **Save Changes** and then **Write Settings to Flash**.

Note: The table shows settings in addition to the ones shown in the picture. Depending upon your protocol setting, your WAN configuration may have all or only some of the settings shown in the table.

Setting	Description
Protocol (Internet Connection type)	Your Internet Service Provider supplies this value. If your service provider instructs you to use 1483 Bridged mode, select **1483 Bridged + NAT** to take advantage of your modem's advanced routing and firewall features.
Encapsulation	The encapsulation value should match your DSL provider's encapsulation. The value refers to the way that data is passed over the Internet. An example value is LLC (**L**ogical **L**ink **C**ontrol). Your DSL provider supplies this value when you sign up for ADSL service.
VPI	**V**irtual **P**ath **I**dentifier ranges from 0 – 256. Your DSL provider supplies the VPI when you sign up for ADSL service.
VCI	**V**irtual **C**ircuit **I**dentifier ranges from 0 – 65536. Your DSL provider supplies the VCI when you sign up for ADSL service.
Username	Your DSL provider supplies this username when you sign up for ADSL service. (It is not the same as the username and password for the **Zoom Configuration Manager**.)
Password	Your DSL provider supplies this password when you sign up for ADSL service.
Service Name	This is an optional value that your service provider may ask you to enter.

Setting	Description
Disconnect timeout	The amount of time before the PPP connection drops if there is no activity. A value of 0 means stay connected even if your network stays idle.
Authentication	The type of authentication protocol used during the negotiation of the PPP connection. This protocol may be specified by your ISP. One option, CHAP (**C**hallenge **H**andshake **A**uthentication **P**rotocol), encrypts your user name and password during the negotiation. **P**assword **A**uthentication **P**rotocol does not.
NAT	Network Address Translation. By default, this setting is **Enabled**. NAT keeps a table of individual private IP addresses in your network and refers to the table when incoming requests are made. If no matches are found, the incoming data cannot come into your network. An **Enabled** setting keeps your IP addresses hidden from outside users. **Disabled** is some times used if you want to use Public IP addresses.
MTU	Maximum Transmission Unit. Largest physical packet size, measured in bytes, that the modem can send. Any messages larger than the MTU have to be fragmented before being sent.
Obtain IP Address	Enable this button if your service provider is using DHCP and you are using the 1483 protocol. If you are unsure of what your service provider is using select this button.
Specify an IP Address	Enable this button if you are using a static IP address and you are using 1483 protocol. Typically you have to request and pay extra for a static IP address.

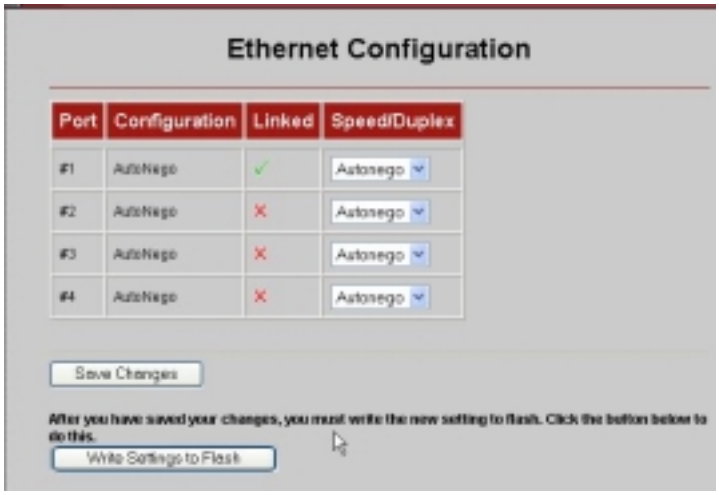
Setting	Description
IP Address, Subnet Mask, Default Gateway, and DNS	If you are using a Static IP address, enter the values for **IP Address**, **Subnet Mask**, **Default Gateway**, and **DNS server** that your service provider gave you. You must also be using the 1483 protocol.
Ethernet Filter Type	Specifies the type of Ethernet filtering that is performed by the bridge interface. **All-** Allows all types of Ethernet packets through the port. **Ip-**Allows only IP/ARP types of Ethernet packets through the port. **PPPoE-**Allows only PPPoE types of Ethernet packets through the port.
ATM **Traffic Class** **Peak Cell Rate** **Burst Tolerance** **Max Cell Rate** **Max Burst Rate** **Sustainable Cell Rate**	These settings allow you to give priority to data that is sent over the network. **Important!** You must make arrangements with your DSL provider to use anything except UBR (**U**nspecified **B**it **R**ate) in the Traffic Class setting. Your service provider will also supply you with the Cell, Burst, and Tolerance Rates.

Setting	Description
RIP	RIP is an Internet protocol that you can set up to share routing table information with: • LAN devices that support RIP • Remote networks connected via the ADSL line • Your ISP's location Most small home or office networks do not need to use RIP since they have only one router and one path to an ISP. In these cases there is no need to share routes because all Internet data from the network is sent to the same ISP gateway. You may want to configure RIP if any of the following circumstances apply to your network: • Your home network setup includes an additional router or RIP-enabled PC or device. These routers will need to communicate via RIP to share their routing table information. • Your network connects via the ADSL line to a remote network, such as a corporate network. In order for your modem to learn the routes used within your corporate network, they should both be configured with RIP. • Your ISP requests that you run RIP for communication with devices on their network
Accept V1	Accept Version 1 of the RIP protocol.
Accept V2	Accept Version 2 of the RIP protocol.
Sent V1	Send Version 1: Send RIP information to other RIP-enabled devices.
Sent V2	Send Version 2: Send RIP Information to other RIP-enabled devices.

Using the Ethernet Configuration Settings

Do I need to change my Ethernet settings?

The **Ethernet Configuration** page contains information about the Ethernet ports on your ADSL modem. Typically you should not need to change these settings. However, if you are having problems establishing your Ethernet connection, you may need to change the **Speed / Duplex** value to match that of the Ethernet NIC in your computer. Here is a picture of the **Ethernet Configuration** page:



The following table describes the Ethernet Configuration settings. If you change any of the settings, click **Save Change**s, and then **Write Settings to Flash**.

Setting	Description
Port	The Ethernet Ports 1-4 on the back of your modem.
Configuration	Shows how your Ethernet ports are set up.

Setting	Description
Linked	A check mark indicates that the Ethernet port is connected.
Speed/Duplex	If you are having problems establishing your Ethernet connection, try setting the Speed/Duplex value to match that of the Ethernet NIC in your computer.

Setting Up a Static Routing Table

Do I need static routing?

Most users do not need to set up static routes. The default route used in your modem will forward all packets correctly. However, if you set up your network with different subnets, you can use static routing to ensure your packets are handled correctly.

You can manually create a static route to tell the modem how to reach a specific IP network. The route entry specifies a destination network (or single host), together with a mask to indicate what range of addresses the network covers, and a next-hop gateway address or interface. If there is a choice of routes for a destination, the route with the most specific mask is chosen.

To route to a destination that is not on any local network, a route may be added via a gateway, for instance another router. The gateway IP address must be on the same subnet as one of the router's interfaces. Here is a picture of the **Static Routes** page:

The following table describes Routing Table settings. If you change any of the settings, click **Add**, and then **Write Settings to Flash**.

Setting	Description
Existing Routes	This table shows the existing Static routes set up on your ADSL Modem.
Destination	Enter the **subnet IP address** of the destination.
Gateway	Enter the **Gateway IP address** of your destination's subnet. The HOP gateway must be on the same subnet as the modem.
Mask	Enter the **subnet mask** (range of IP addresses) of the destination IP addresses based on the above subnet IP address of the destination.
Metric	The number of hops. **This should usually be left at 1**.
Advertise	Enable this if you want to advertise this route.

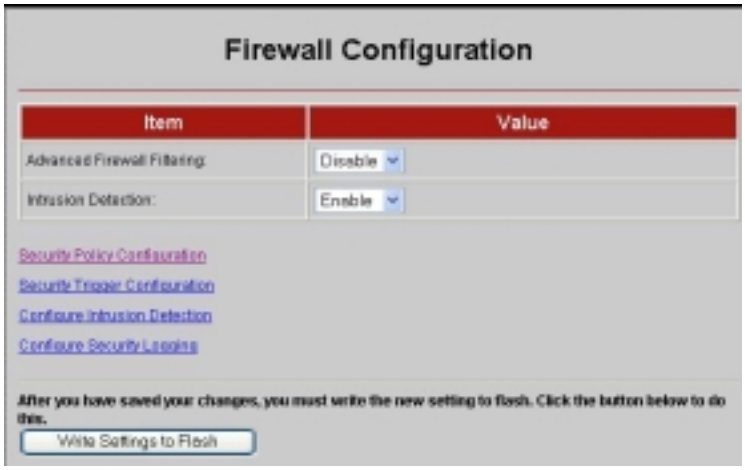
Adding Extra Security with Advanced Firewall Filtering

Do I need extra security?

Setting up advanced firewall security provides an additional layer of security. For example, if you create a DMZ interface for gaming using the **Virtual Server / DMZ** page, you can enable the firewall filtering and add a security policy that blocks IP addresses, ports, aliases, and certain protocols from reaching the DMZ machine.

When you use the **Advanced Firewall Filtering** feature, you will move through multiple screens. Follow the steps below to set up this feature.

1 Open the **Firewall Configuration** page by clicking **Firewall** on the **Advanced Setup** page:

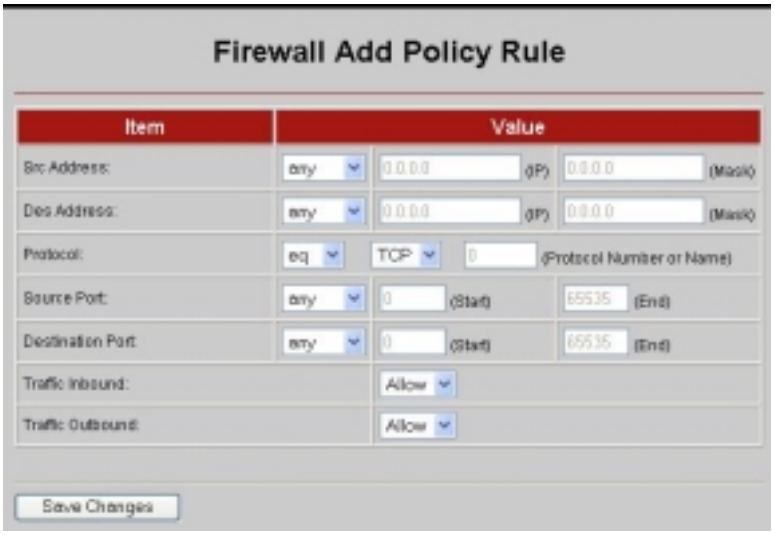


2 **Important!** Do not **Enable Advanced Firewall Filtering** on the **Firewall Configuration** page until you create your security policy. Otherwise, if you **Enable Firewall Filtering** before you create your policy, you will block all outgoing and incoming traffic. To set up your policy, click the link to **Security Policy Configuration** and open the page.

3 Choose the **Policy Type** that you want then click the **Policy Rules** link. You can set one of three **Policy Types**. Choose the **External – Internal** policy to allow or block what is sent from the WAN to the LAN. Choose the **External –DMZ** policy to allow or block what is sent from the WAN to the DMZ machine or the Virtual Server. Choose the **DMZ-Internal** policy to allow or block what is sent from a DMZ machine to your LAN.

4 Click the **Policy Rules** link of the **Policy Type** that you want. The **Firewall Add Filter Rules** page opens. Click the **Add Policy Rule** link.

5 After you click the link, the **Firewall Add Policy Rule** page opens:



You use the settings on the **Firewall Add Policy Rule** page to configure your firewall security. In setting your criteria or rules, it is important to know whether you want to block traffic or allow traffic into your network. This is controlled by the **Traffic Inbound** and **Traffic Outbound** settings where you choose **Allow** or **Block**. After you determine what you want to do, you then fill in the other settings to specify what it is that you want to block or allow.

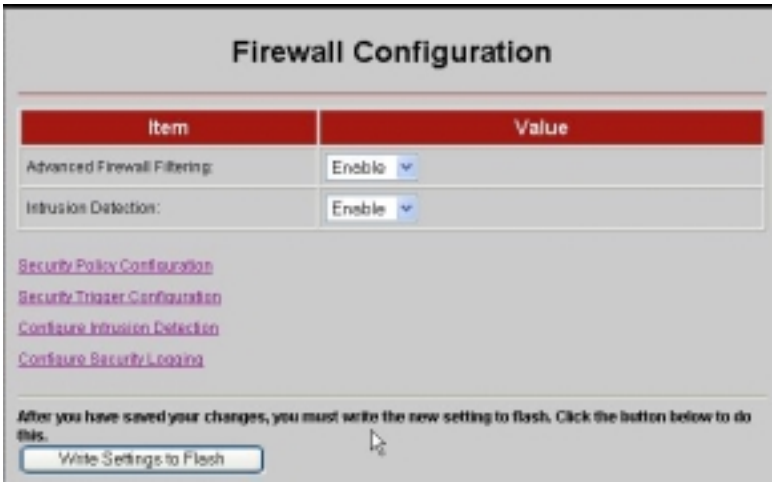
Suppose you enter **Allow** in the **Traffic Inbound** and **Outbound** settings and **Any** in the **Src Address** setting. This sets the firewall to allow any traffic into your network. Conversely, suppose you choose **Block** for **Traffic Inbound**, choose **Assign** for **Src Address** and specify **a range of IP addresses**. This sets the firewall to block all traffic that has the IP addresses you specified.

The table that follows shows you the criteria that you can enter:

Setting	Description
Src Address	Source Address lets you specify **Any** for all IP addresses or a specific range of IP addresses from a particular source to be blocked or allowed.
Des Address	Destination Address lets you specify **Any** for all IP addresses or a specific range of IP addresses of a destination to be blocked or allowed.
Protocol	Protocol lets you specify a protocol to be blocked or allowed. **eq** is equals and **neq** is not equal. For example, **eq TCP** will allow only TCP. **neq TCP** will allow everything including TCP.
Source Port	Lets you block or allow traffic from a particular port.
Destination Port	Lets you block or allow traffic going to a destination port.
Traffic Inbound	Lets you block or allow inbound traffic based on the rules you set up in the policy.
Traffic Outbound	Lets you block or allow outbound traffic based on the rules you set up in the policy.

6 Click **Save Changes** then **Write Settings to Flash**.

7 Go back to the **Firewall Configuration** page and select **Enable**. Then click **Write Settings to Flash**.



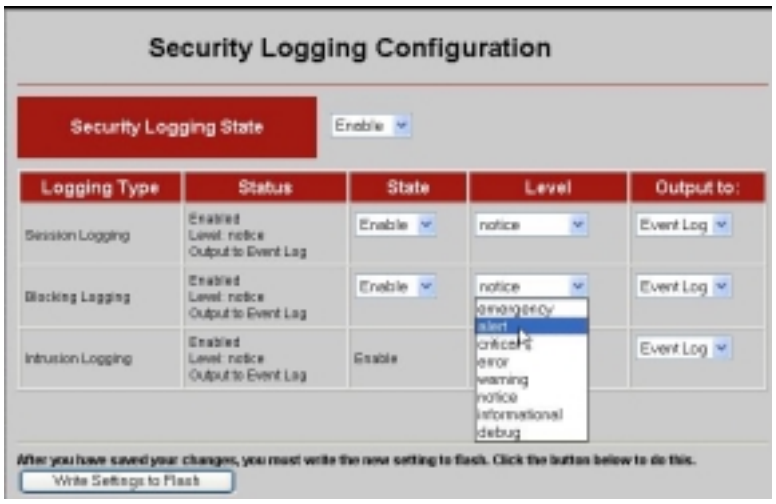
Setting Security Logging

What is security logging?

Security logging is a list of events (computer activity and user activity) that alerts you to potential security issues. Based on the **Level** selected, you can record all or some of these events. It also lets you examine the effectiveness of your blocking and intrusion detection. You can set the level of importance of the logged event and receive alerts if particular IP addresses are trying to gain access to your network.

To set security logging on, follow these steps:

1 Click **Firewall** on the **Advanced Setup** page. Then, click the link to **Configure Security Logging**. The **Security Logging** page opens:



2 Enable the **Logging Types** that you want and set the **Level**. You can also print (**Output to**) the information to your console or to a file (**Event Log**).

Configuring Intrusion Detection

What is intrusion detection?

Intrusion detection protects your network from hackers who use the Internet to damage your network. Your modem's default **Intrusion Detection** setting should work fine for most hacker attacks, but there is additional functionality that you can set up. Your modem offers protection from various Denial of Service (DOS) attacks; prevents users from scanning your ports to try to access your computer; and can blacklist any host trying to damage your network.

Follow these steps to enable additional intrusion detection:

From the **Advanced Setup** page, click **Firewall**. Then click the link to **Configure Intrusion Detection**. The **Configuration** page opens:

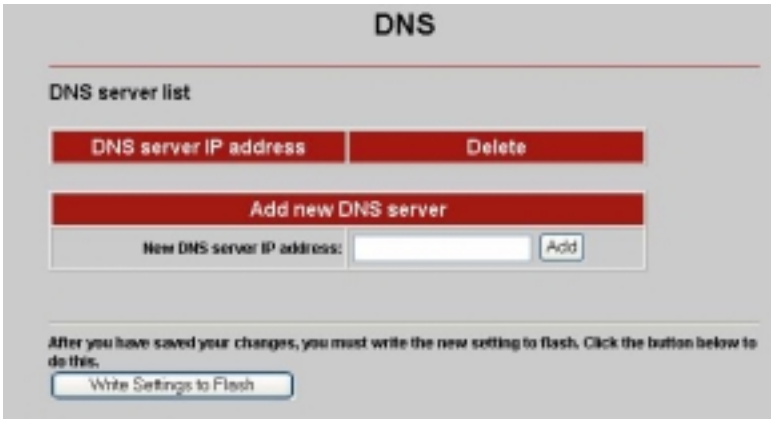
The following table shows you the values you can enter:

Setting	Description
Use Blacklist	Blacklisting denies an external host access to your computer/network if an intrusion from a host has been detected. Access to the network is denied for ten minutes.
Victim Protection Block Duration	The length of time that packets destined for the victim of a spoofing attack are blocked.
Use Victim Protection	Protection for your system against broadcast pings. An attacker sends out a ping with a broadcast destination address and a spoofed source address. Packets destined for the victim of a spoofing attack are blocked for a specified duration.
DOS Attack Block Duration	The duration that hosts are blocked once a Denial of Service (DOS) attack is detected.
Scan Attack Block Duration	The length of time that traffic from IP addresses doing the port scan are blocked once a port scan is detected. Port scans are used to determine if you have any open ports that can be accessed.
Maximum TCP Open Handshaking Count	Sets the maximum number of TCP open session requests allowed per second before a SYN flood attack is detected. SYN Flood is a specific type of DOS attack.
Maximum Ping Count	Sets the maximum number of pings per second before an Echo Storm is detected. Echo Storm is a DOS attack where the attacker sends oversized ICMP datagrams to the network using the ping command.
Maximum ICMP Count	Sets the maximum number of ICMP packets per second before an ICMP Flood is detected. ICMP Flood is a DOS attack where the attacker tries to flood the network with ICMP packets in order to prevent legitimate network traffic.

Adding a DNS Server Name

Do I need to add a DNS server name?

Typically you should not need to enter a DNS server name as it is assigned automatically when your connection is established. However, your ISP may instruct you to enter an **IP address** for a **DNS server name**. Here is a picture of the DNS page where you add the **IP address**:



The following table shows you the values to enter. After you enter the value, click **Add,** then **Write Settings to Flash**.

Setting	Description
DNS Server List	Shows the list of currently configured DNS servers.
New DNS Server IP Address	Enter the **IP address** of the DNS server that your ISP instructed you to enter.

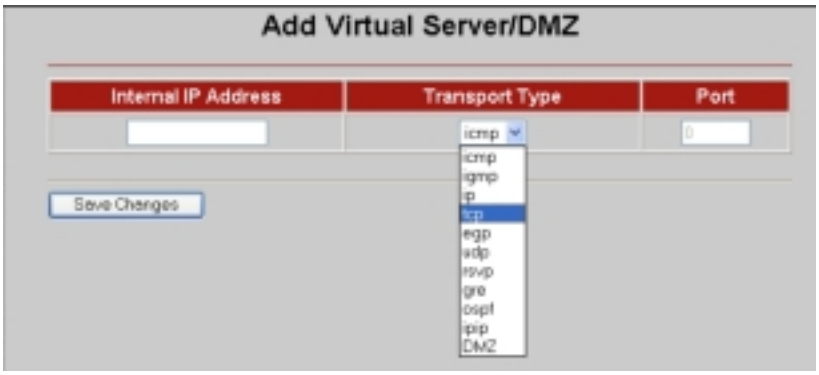
Creating a Virtual Server or a DMZ

Do I need to create a virtual server or DMZ?

By default, your modem uses NAT to hide your computers from users on the Internet; however, there may be times when you want to allow access by outside users to a computer on your network. For instance, you would want to allow access if a computer in your network is hosting Internet games or running a web server. For more information about the **Virtual Server / DMZ** feature and the differences between a virtual server and a DMZ, see page 38. For information about setting up a Virtual Server or DMZ for gaming, see **Setting Up the X6 for Online Gaming** on page 32.

Here is a picture of the **Virtual Server / DMZ** page:

Clicking the **Add Virtual Server / DMZ** link opens the **Add Virtual Server / DMZ** page:



The following table shows you the values you can enter. After you enter the value, click **Save Changes,** then **Write Settings to Flash**.

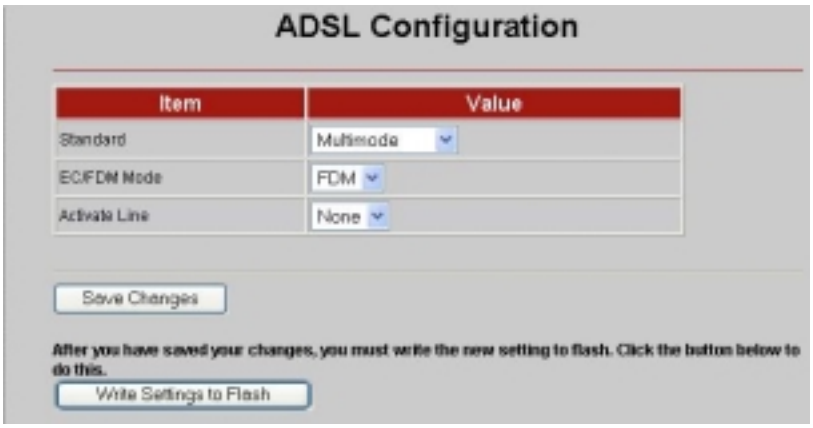
Setting	Description
Internal IP Address	The IP address of the computer where you will set up the virtual server or DMZ. **Note:** You should use fixed IP mapping to ensure that the computer you are setting up as the virtual server or DMZ is always assigned the same IP address by your modem's DHCP server. To assign a fixed IP map, see **Step 1: Choosing an IP Address for Gaming** on page 32.
Transport Type (Protocol)	Select the protocol that you want to allow through to the computer. Select **DMZ** if you want to allow all protocols and all ports to be open on the computer.

Setting	Description
Port	If you selected **TCP** or **UDP**, you must specify the port where you want to allow access. If you want multiple ports to be open, add a virtual server for each port that you want open. If you selected **DMZ**, you cannot specify a port.

Using the ADSL Settings

Do I need to change my ADSL settings?

Typically you should not need to change your ADSL settings; however, you may be instructed to do so by your service provider. Or, if you are having problems establishing a physical layer connection, you may want to change a couple of the settings on the **ADSL Configuration** page. Here is a picture of the **ADSL** page where you change your settings:



The following table shows you the values to enter. After you enter the values, click **Save Changes,** then **Write Settings to Flash**.

Setting	Description
Standard	If you are having problems establishing the physical layer connection, you can try selecting the different settings to see if it helps you connect. (If the link light on the modem is blinking than the physical layer connection is down, if the link light is solid than the problem is elsewhere.)
EC/FDM Mode	If you are having problems establishing the physical layer connection than you can try changing this value to **EC**.
Activate Line	Select **None** if there are no changes to the current mode. Select **Abort** if you want to stop the modem from connecting. The status will show up as idle on the **ADSL Status** page. Select **Start** to restart the connection.

Changing Your LAN Settings

When would I need to change my LAN settings?

DHCP (**D**ynamic **H**ost **C**onfiguration **P**rotocol) is a protocol that enables your modem to manage the assignment of IP addresses to computers and devices on your LAN network. Enabling DHCP on your modem allows it to assign temporary IP addresses to your computers whenever they connect to your network. You can control the amount of time that lapses before a new address is issued or renewed. You can extend the range of IP addresses that are assigned to your network devices should you add new devices to your network. You can also change the default LAN IP address for your modem.

Here is a picture of the **LAN Configuration** page:

The following table shows you the values to enter. After you enter the values, click **Save Changes,** then **Write Settings to Flash**.

Setting	Description
IP Address	The IP address of your modem.
Subnet Mask	The modem's subnet mask address.
Status	**You should leave this setting on Enable**. Disable would require you to set up fixed IP addresses for all of the devices in your network.
Maximum Lease Time	The maximum amount of time, in seconds, that a device in your network will have the temporary IP address before a new one is issued by the modem's DHCP server. (86,400 seconds equals 24 hours)
Default Lease Time	The Default amount of time that your modem's DHCP server will assign an IP address.
Start IP Address	The first IP address of a range that you specify using the Start and End IP Address settings. Your modem's DHCP server will assign the IP addresses in this range at random to the computers and devices in your network
End IP Address	The last IP address of a range that you specify using the Start and End IP Address settings. Your modem's DHCP server will assign numbers from this range at random to the computers and devices in your network. By default the DHCP server has 12 addresses available to assign. If you plan on attaching more than 12 devices to your network, change the ending IP address to allow for more devices.

Creating a Fixed IP Address

How do I create a fixed IP address?

You create a fixed IP Address for a computer on your network using the **DHCP Server Fixed Host** page. The button to this page is found on the **LAN Configuration** page.

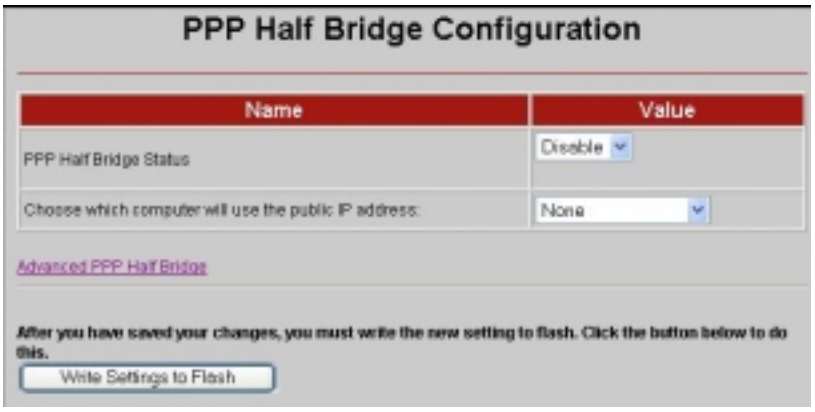
You will want to create a fixed IP Address if you are setting up a computer, Xbox, or Playstation for gaming. To create a fixed IP address, see steps 2-6 in **Step 1: Choosing an IP Address for Gaming** on page 32.

Assigning a Half Bridge Device

When would I assign a half bridge device?

Assigning a **PPP Half Bridge** assigns a public IP address to a computer that you choose so you can bypass the modem's NAT feature and open up all ports on your computer. You may want to do this if you are using an application that requires multiple ports on a computer in your network. Some examples are video conferencing applications, gaming applications, and instant messaging.

Here is a picture of the **Half Bridge Configuration** page:



To set up a half bridge configuration, you set the Half Bridge status to **Enable**. From the drop-down list, choose the computer that you want to share the public IP address. This default setup for the PPP Half Bridge works for most applications. You should not need to make additional changes using the **Advanced PPP Half Bridge**.

Enabling or Disabling UPnP

Universal **P**lug a**n**d **P**lay (UPnP) with **I**nternet **G**ateway **D**evice (IGD) protocol is installed in X6 units when they are shipped by Zoom. Change this setting only if you have a good reason to do so.

To change the status of Universal Plug and Play, on the **Advanced Setup** page click **UPnP**:

Setting	Description
Enable UPnP IGD Function	Select this check box to enable or disable **U**niversal **P**lug a**n**d **P**lay with **I**nternet **G**ateway **D**evice (IGD) protocol. By default UPnP is enabled.

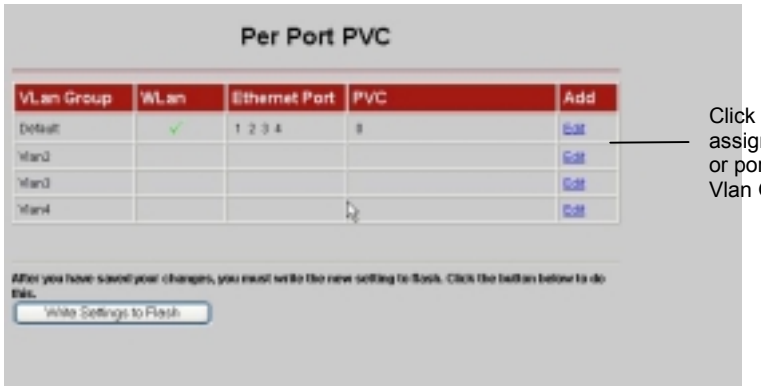
Click **Save Changes** and then **Write Settings to Flash** to save your UPnP setting to permanent memory.

Assigning Ports to a PVC

Normally you should not change Per Port PVC (**P**ermanent **V**irtual **C**ircuit) settings unless your ISP tells you to do so.

If you have more than one PVC set up, you can use this feature to assign Ethernet ports to the additional PVC(s). Per Port PVC is typically used to assign different video streams to particular Ethernet ports.

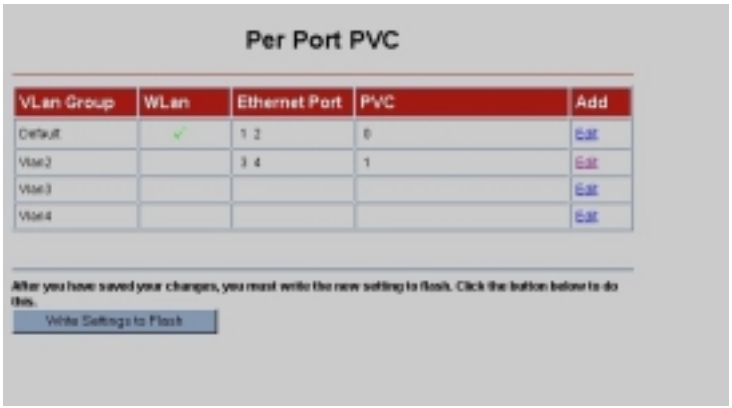
To assign ports to a PVC, on the **Advanced Setup** page click **Per Port PVC**:



To assign a port to PVC 1, in the **Add** column for **Vlan2** (see above) click **Edit** to display the **Assign Ports** screen:

Setting	Description
WLAN	If you are assigning a wireless device – for example, a wireless set-top box for your television set – to an additional PVC, select this check box to assign PVC 1 to the X6's wireless port. This port will no longer be assigned to PVC 0.
Ethernet Port	If you are assigning a wired device to PVC 1, select the LAN port or ports. These ports will no longer be assigned to PVC 0.
PVC	Select the PVC number. **Note**: While you can create up to eight separate PVCs (0 to 7) by assigning different VPI and VCI settings (see page 14) only four can be used for Per Port PVC..
Return to Per Port PVC screen	Click this link to return to the main **Per Port PVC** screen.

If you assigned Ethernet (LAN) ports 3 and 4 to PVC 1, note that those ports are no longer available to PVC 0:



Click **Write Settings to Flash** to save your PVC port settings to permanent memory.

Changing HTTP and Telnet Ports

This feature lets you change the default X6 ports for Internet and Telnet traffic. If, for example, you are running another Internet server on the network and that server is using Port 80, you need to assign a different port to the X6 to avoid a conflict.

To assign Internet (HTTP) or Telnet ports, on the **Advanced Setup** page click **Port Settings**:

Setting	Description
HTTP Port	Enter a port number between 61000 and 62000. (The default is 80.)
Telnet Port	Enter a port number between 61000 and 62000. (The default is 23.)

Click **Save Changes** and then **Write Settings to Flash** to save the new port settings to permanent memory. Reboot your PC to make the settings active.

When the new port settings are saved, network users who want to access the X6 via the Internet must add a colon [**:**] plus the new port number after the X6's IP address. For example, in their browser's address bar, users would enter **10.0.0.2:61101**, where 61101 is the new Internet port.

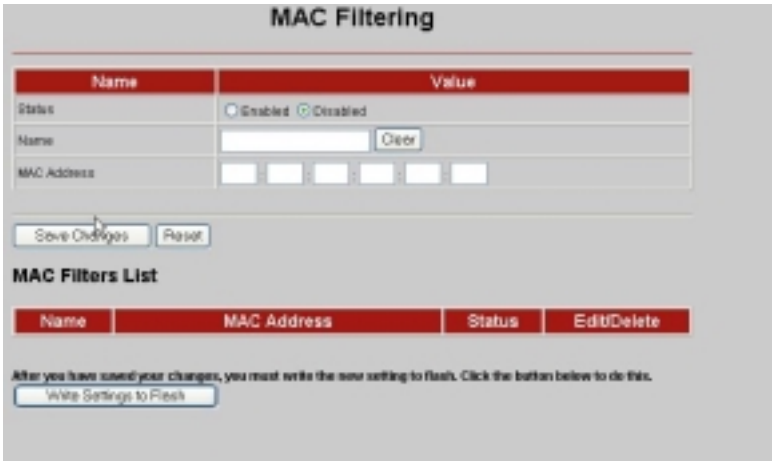
To access the X6 via Telnet, users would type **telnet[space]10.0.0.2[space]61102**, where 61102 is the new port.

Filtering Out MAC Addresses

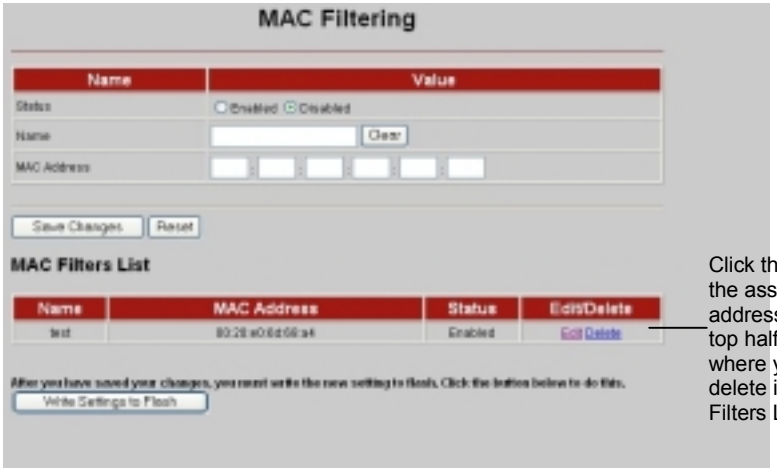
Most users will not need this feature.

However, if there is a PC or other device on the X6 network that you don't want using the Internet, you can use MAC address filtering to deny the device Internet access. (That computer or device will still be able to communicate with other devices on the LAN, such as printers.)

To block Internet access, on the **Advanced Setup** page click **MAC Filtering**:



Setting	Description
Status	Select **Enabled** to deny Internet access to the specified MAC address. The default is **Disabled**.
Name	Enter the name associated with the MAC address.
MAC Address	Enter the 12-digit address without separators.
Save Changes	Click this button to display the MAC address information in the **MAC Filters List** (see next page).
Reset	Before you click **Save Changes**, you can click this button to clear all entries.



Click this link to display the associated MAC address information in the top half of the screen, where you can edit it or delete it from the MAC Filters List.

MAC Filters List	
Edit/Delete	Click this link to edit or delete the associated MAC address information. To delete, click the **Reset** button in the top half of the screen.

Click **Save Changes** and then **Write Settings to Flash** to save the **MAC Filters List** to permanent memory.

Managing Access to Services

To change access settings, on the **Advanced Setup** page click **Management Control**:

Setting	Description
LAN Access	If a check box is selected, the associated service is enabled for local network users. The default for all services is **Enabled**.
WAN Access	Select a check box to enable the associated service for remote network users. By default, all the services are **Disabled** for remote users.

Click **Save Changes** and then **Write Settings to Flash** to save the service availability configuration to permanent memory.

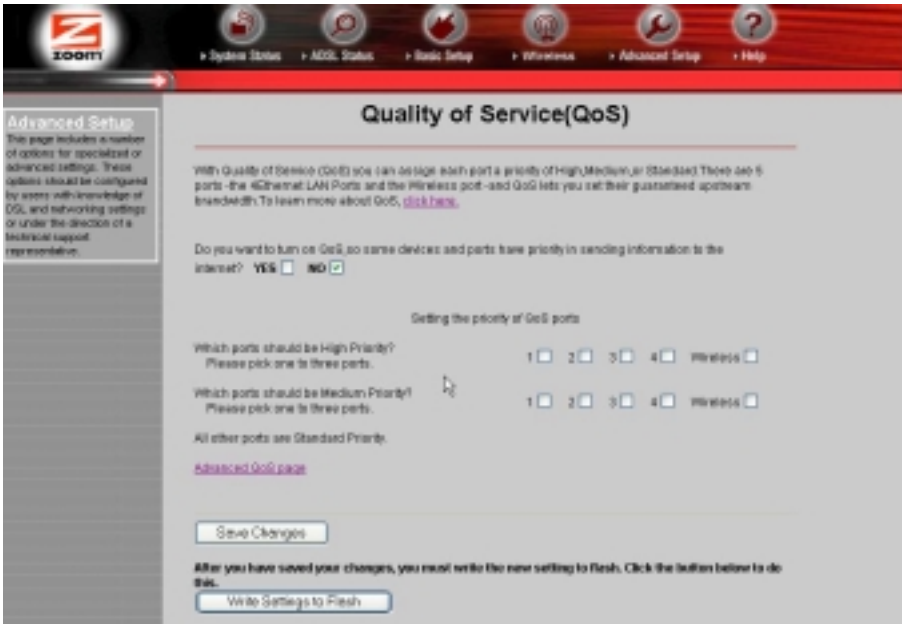
Configuring Quality of Service

Quality of Service (QoS) helps guarantee upstream bandwidth for applications that require fast and dependable throughput. For example, QoS can slow down a photo upload so a phone call can proceed without garbling, and/or a gamer can enjoy faster response time.

With QoS you can assign each of the four LAN ports and the wireless port a priority of High, Medium or Standard. High priority ports together share a guaranteed percentage of upstream bandwidth, typically 70%. Medium priority ports share a lower guaranteed percentage, typically 20%. Standard priority ports share the remaining upstream bandwidth that is guaranteed to them. If ports aren't using their guaranteed bandwidth, the excess bandwidth becomes available to other ports in order of priority.

For VoIP, you normally assign a High Priority QoS port. For a gaming device, you may want to assign a High or Medium priority. For ports used for web browsing, normally you use Standard priority .

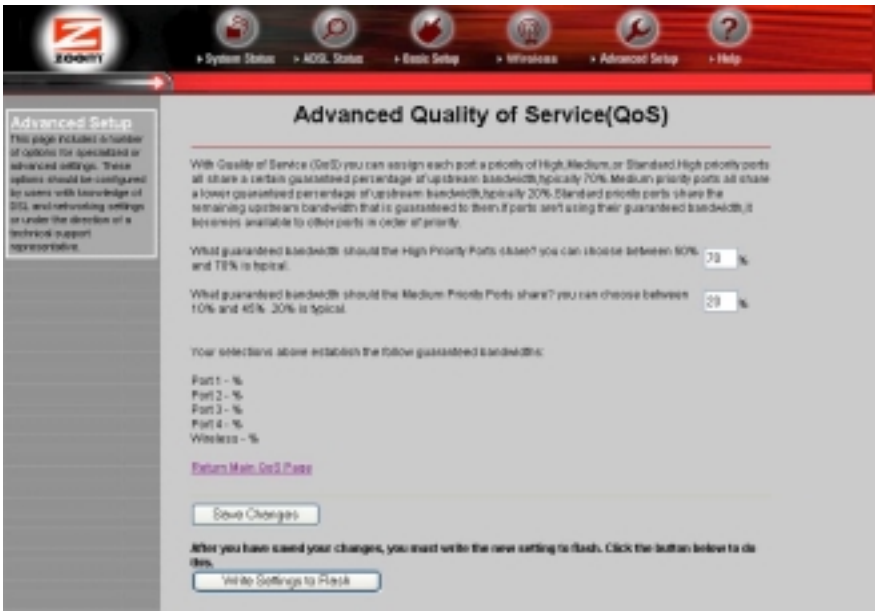
QoS is normally set up by using the Install Assistant CD that comes with the X6. To configure Quality of Service on the **Advanced Setup** page instead, click **QoS**. For a help message, select the **Click here** link in the first paragraph.



Note that on the QoS screen, Port 1 is the Ethernet port labeled LAN 1 on the X6 back panel. Port 2 is LAN 2, and so forth.

Setting	Description
Do you want to turn on QoS . . . .?	If you click **YES** to assign priorities to the X6's LAN and wireless ports, by default LAN port 1 is set to High Priority, LAN port 2 is set to Medium Priority, and LAN ports 3 and 4 as well as the wireless port are set to Standard priority. These default settings can be changed. The default is **NO**.
Which ports should be High Priority?	Select one to three ports. By default, these ports will together share 70% of the upstream bandwidth. You can configure a different percentage on the **Advanced**

	QoS page (see page 85).
Which ports should be Medium Priority?	Select one to three ports. By default, these ports will together share 20% of the upstream bandwidth. You can configure a different percentage on the **Advanced QoS** page (see below).
Advanced QoS page	Click this link to specify a different upstream bandwidth percentage for High, Medium and Standard priorities.



Setting	Description
What guaranteed bandwidth should High Priority Ports share?	The default is 70%. You can enter a different whole number percent. The High Priority and Medium Priority percentages together must be less than 100. **Note**: Standard Priority ports must have at least 1% of the upstream bandwidth.
What guaranteed bandwidth should Medium Priority Ports	The default is 20%. You can enter a different whole number percent. The Medium Priority and High Priority

share?	percentages together must be < 100. **Note**: Standard Priority ports must have at least 1% of the upstream bandwidth.
Return Main QoS page	Click to return to the main QoS page.

After you make your selections, click **Save Changes,** then **Write Settings to Flash**.

Monitoring ADSL, Wireless, and Ethernet Status

How should I use the ADSL, Wireless, and Ethernet Status Reports?

These reports are useful tools for evaluating your system and for troubleshooting. Should a problem arise, a Technical Support Representative may ask you for the information that is contained in the reports.

Wireless Status Report

Here is a picture of a typical **Wireless Status** Report:

The **Wireless Status** Report shows you the modem speed (Link Speed), the SSID, your default channel, the Mac Address of the modem, and the number of packets that are being received and transmitted (Rx and Tx Packets). You can also tell if your modem

has wireless encryption enabled. (To encrypt your information, click the **Wireless** icon in the **Zoom Configuration Manager**).

ADSL Status Report

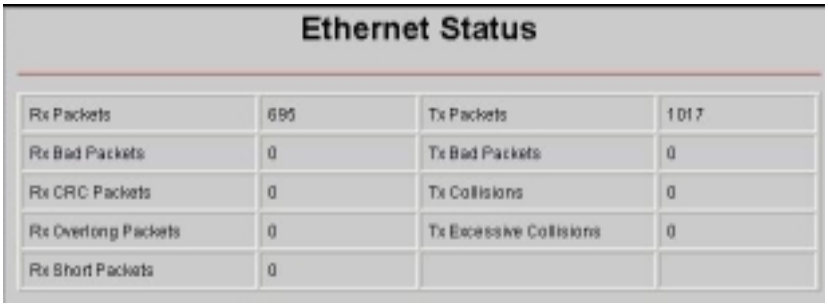
Here is a picture of the **ADSL Status** Report:

The **ADSL Line State** tells you where your modem is in the connection process. The three states are **Training, Handshake**, and **ShowTime**. A line state of ShowTime shows that your modem has established a physical connection to the DSLAM (DSL Access Multiplexer – a device used in the process of connecting your computers, and/or network to the Internet). Training is at the beginning of the connection and Handshake is right after Training.

The **Downstream** and **Upstream** values tell you the speed at which information is being downloaded from the Internet (Downstream) and uploaded to the Internet (Upstream).

Ethernet Status Report

Here is a picture of the **Ethernet Status** Report:



Ethernet Status

Rx Packets	695	Tx Packets	1017
Rx Bad Packets	0	Tx Bad Packets	0
Rx CRC Packets	0	Tx Collisions	0
Rx Overlong Packets	0	Tx Excessive Collisions	0
Rx Short Packets	0		

The Ethernet Status Report gives you information about the receive (Rx) and transmission (Tx) rates of packets.

Changing Your Password

When should I change my password?

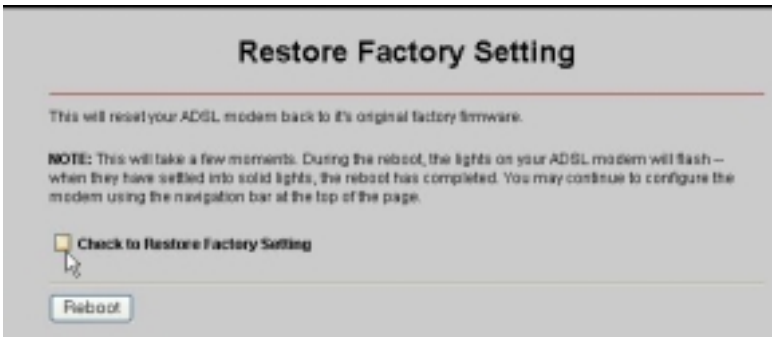
For added protection of your X6 settings, you can change the Zoom login password after you have logged into the **Zoom Configuration Manager**. Here is a picture of the page where you enter your Old Password and New Password:

Be sure to write your new settings to Flash, and to remember your new password. If you forget your password, see **Restoring Factory Settings** on page **90**.

Restoring Factory Settings

When would I need to restore my factory settings?

Should you forget your password, you can restore your modem to the factory settings. This will restore the **admin/zoomadsl** login to the **Zoom Configuration Manager** on your computer. You can login using the Zoom login and then change your password. Here is a picture of the **Restore Factory Settings** page:



Follow the instructions on the page to reset your ADSL modem to its original firmware. Please see **Backing Up and Restoring Your Configurations** on page 91 for information about restoring a stored X6 configuration.

Backing Up and Restoring Your Configurations

When would I need to back up and restore my configuration settings?

It is a good idea to back up your configuration settings after you set up the X6, and also before you upload new firmware. Then if the update overwrites your configurations, you can put them back using the **Restore** option. You may also want to back up your configurations so you can use them to set up the same configurations in other modems.

Here is a picture of the **Backup/Restore Configuration** page:

Follow the instructions on the page to back up or restore your configuration settings.

Updating Your Firmware

How do I update my firmware?

Periodically you may want to update the firmware on your X6 modem. To do this, you download the Image file from the Zoom Web Site to your computer. You then use the **Firmware Update** option to upload the file to your modem.

Important! It is recommended that you backup your modem's configurations before you upload the firmware. (See **Backing Up and Restoring Your Configurations** on page 91). Also, **do not** turn off the modem or unplug it while the upload is in progress.

Here is a picture of the **Firmware Update** page:

Click **Browse** to go to the firmware update file. Then click **Image Upload**.

Appendix A
ADSL Internet Settings Tables

Below are two tables, one for the USA and one for other countries. These tables are for customers whose service providers do not supply them with ADSL settings. Many ADSL providers use different settings depending on the region where they are operating. This is why there may be more than one setting for your service provider. If you refer to the tables and there is more than one listing for your service provider, the most common is labeled (1), the next (2), and so on. We recommend that you try them in order starting with 1.

We post updated tables on our Web site. If your service provider or country is not listed in the tables below, please consult **www.zoom.com**

Note to USA customers

If your ADSL service provider is not shown below, use the settings for **Service Provider Not Shown** at the bottom of the table. If those settings do not work, use the settings for the company that provides local telephone service in your area. (Refer to page 12 for more detailed installation instructions on entering the settings.)

Table A: USA

Service Provider	VPI	VCI	Encapsulation
AllTel (1)	0	35	PPPoE LLC
AllTel (2)	0	35	1483 Bridged IP LLC
August.net (1)	0	35	1483 Bridged IP LLC
August.net (2)	8	35	1483 Bridged IP LLC
BellSouth	8	35	PPPoE LLC
CenturyTel (1)	8	35	PPPoE LLC
CenturyTel (2)	8	35	1483 Bridged IP LLC
Covad	0	35	PPPoE LLC
Earthlink (1)	0	35	PPPoE LLC
Earthlink (2)	8	35	PPPoE LLC
GWI	0	35	1483 Bridged IP LLC
Qwest (1)	0	32	PPPoA LLC
Qwest (2)	0	32	PPPoA VC-MUX
SBC (1)	0	35	PPPoE LLC
SBC (2)	0	35	1483 Bridged IP LLC
SBC (3)	8	35	1483 Bridged IP LLC
Sprint (1)	0	35	PPPoA LLC
Sprint (2)	8	35	PPPoE LLC
Verizon (1)	0	35	PPPoE LLC
Verizon (2)	0	35	1483 Bridged IP LLC
Service Provider Not Shown	0	35	PPPoE LLC

Table B: Countries Other Than the USA

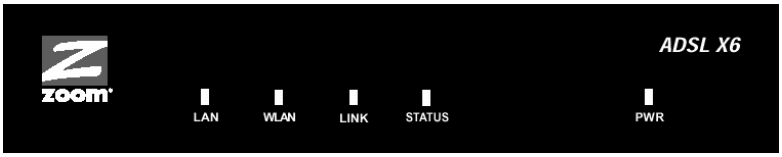
Service Provider	VPI	VCI	Encapsulation
Australia-Telstra	8	35	PPPoA LLC
Argentina-Telecom	0	33	PPPoE LLC
Argentina-Telefonica	8	35	PPPoE LLC
Belgium-ADSL Office	8	35	1483 Routed IP LLC
Belgium-Turboline	8	35	PPPoA LLC
Bolivia	0	34	1483 Routed IP LLC
Brazil-Brasil Telcom	0	35	PPPoE LLC
Brazil-Telefonica	8	35	PPPoE LLC
Brazil-Telmar	0	33	PPPoE LLC
Brazil-South Region	1	32	PPPoE LLC
Colombia-EMCALI	0	33	PPPoA VC-MUX
Denmark-Cybercity, Tiscali	0	35	PPPoA VC-MUX
France (1)	8	35	PPPoE LLC
France (2)	8	67	PPPoA LLC
France (3)	8	35	PPPoA VC-MUX
Germany	1	32	PPPoE LLC
Hungary-Sci-Network	0	35	PPPoE LLC
Iceland-Islandssimi	0	35	PPPoA VC-MUX
Iceland-Siminn	8	48	PPPoA VC-MUX
Israel	8	48	PPPoA VC-MUX
Italy	8	35	PPPoA VC-MUX
Jamaica (1)	8	35	PPPoA VC-MUX
Jamaica (2)	0	35	PPPoA VC-MUX
Jamaica (3)	8	35	1483 Bridged IP LLC SNAP
Jamaica (4)	0	35	1483 Bridged IP LLC SNAP
Kazakhstan	0	33	PPPoA VC-MUX
Mexico	8	35	PPPoE LLC
Netherlands-BBNED	0	35	PPPoA VC-MUX
Netherlands-MX Stream	8	48	PPPoA VC-MUX
Portugal	0	35	PPPoE LLC
Saudi Arabia (1)	0	33	PPPoE LLC
Saudi Arabia (2)	0	35	PPPoE LLC
Saudi Arabia (3)	0	33	1483 Bridged IP LLC
Saudi Arabia (4)	0	33	1483 Routed IP LLC
Saudi Arabia (5)	0	35	1483 Bridged IP LLC
Saudi Arabia (6)	0	35	1483 Routed IP LLC

Table B (Continued): Countries Other Than the USA

Service Provider	VPI	VCI	Encapsulation
Spain-Albura, Tiscali	1	32	PPPoA VC-MUX
Spain-Colt Telecom, Ola Internet	0	35	PPPoA VC-MUX
Spain-EresMas, Retevision	8	35	PPPoA VC-MUX
Spain-Telefonica (1)	8	32	PPPoE LLC
Spain-Telefonica (2), Terra	8	32	1483 Routed IP LLC
Spain-Wanadoo (1)	8	35	PPPoA VC-MUX
Spain-Wanadoo (2)	8	32	PPPoE LLC
Spain-Wanadoo (3)	8	32	1483 Routed IP LLC
Sweden-Telenordia	8	35	PPPoE
Sweden-Telia	8	35	1483 Bridged IP LLC
Switzerland	8	35	PPPoE LLC
Turkey(1)	8	35	PPPoE LLC
Turkey(2)	8	35	PPPoA VC-MUX
UK (1)	0	38	PPPoA VC-MUX
UK (2)	0	38	PPPoE LLC
Venezuela-CANTV	0	33	1483 Routed IP LLC
Vietnam	0	35	PPPoE LLC

Appendix B
Front and Back Panels

The front panel of the X6 looks like this:



The following table describes each light on the front panel.

Light	Description
LAN	Lights if any LAN port of the X6 is plugged into the Ethernet port of a powered-up device. Blinks when data is sent. Additional lights for each LAN port are on the back of the X6.
WLAN	Lights when the wireless access point is running and enabled. Blinks when data is sent.
LINK	Blinks when the X6 is performing its startup sequence. Stays on solid when the unit has synched up with its ADSL connection. **Note:** If the light fails to switch from blinking to steady after a minute or two, check with your ADSL provider that the ADSL connection is activated, or refer to Appendix D, **Troubleshooting** on page 106.
STATUS	Blinks red once while the X6 is powering up. Then it will only light when there is a problem with the unit. See **If You Need Help** on page 19 for Customer Support contact information.
PWR	Lights when the X6 is plugged into a power source.

The following table describes the back panel.

Port	Description
PWR	Port to connect the unit to the X6's power cube.
RESET	Recessed button to reset the modem to its factory settings. To reset, insert a paper clip and press the button three times.
LAN 1 **LAN 2** **LAN 3** **LAN 4**	LAN ports that can connect the unit to an access point, a network hub, or the Ethernet port of a computer. The X6 has four LAN ports. Each port has a yellow and a green light above it. The yellow light turns on when the port is connected to a 100 megabit per second Ethernet port. The green light blinks when there is activity on that particular LAN line.
ADSL	Jack to connect the modem to the ADSL telephone wall jack.

Appendix C
TCP/IP Network Settings

If you are using a Macintosh or Linux computer, you **must** ensure that your computer's TCP/IP network settings are configured properly. Otherwise you will not be able to connect to the Internet.

Note:
If you are using a Windows computer, you do not have to configure the TCP/IP settings. This is because your Windows computer will automatically configure them for you. Only Windows users who are troubleshooting the X6 will need to verify the TCP/IP settings.

Depending on your operating system, follow the steps in the appropriate section to ensure your TCP/IP settings are correct.

- If you are using Macintosh, see **Macintosh TCP/IP Settings** on page 100.
- If you are using Linux, see **Linux TCP/IP Settings** on page 102.
- If you are using Windows, see **Windows TCP/IP Settings** on page 103.

Macintosh TCP/IP Settings

How you configure your Macintosh computer's network settings differs, depending on your Mac OS. For OS X, follow the instructions below. Otherwise go to page 101.

Mac OS X

1. From the **Dock**, choose **System Preferences** and then **Network** to display the **Network** pane. (For OS X 3, you also have to click the **Configure** button.)

2. Ensure that **Automatic** is selected from the **Location** list box.

3. Under the **Show** drop-down tab, choose **Built-in Ethernet**.

4. Under the **TCP/IP** tab, make sure that **Using DHCP** is highlighted in the **Configure:** list box. Do not enter anything into the **DHCP Client ID** field.

5. Click **Apply Now** (or **Save** if prompted) and close the **Network** pane.

6. Continue with **Step 3: Establishing Communication** on page 12.

Mac OS 7.6.1 - 9.2.2

1 From the **Apple** menu, choose **Control Panels** and then **TCP/IP** to display the **TCP/IP** Window.

2 Under **Connect via:**, select **Ethernet built-in**.

3 Under **Configure:**, select **Using DHCP Server**. Do not enter anything in the **DHCP Client ID** field.

4 Close the **TCP/IP** Window. You will be asked if you want to save the changes. Click **Save**.

5 Continue with **Step 3: Establishing Communication** on page 12**.**

Linux TCP/IP Settings

The instructions for setting up boot-time DHCP vary dramatically by distribution, so you may want to refer to your particular version's documentation.

Once you have followed the instructions for your Linux system, continue with **Step 3: Establishing Communication** on page 12.

Note:
If you have more than one network card installed, you will need to pick distinct Ethernet identifiers for each (eth0, eth1, eth2, and so forth). If you select an identifier other than eth0 for your ADSL modem, use that identifier throughout.

RedHat

Edit or create **/etc/sysconfig/network-scripts/ifcfg-eth0** so that it contains the following three lines:

```
DEVICE=eth0
ONBOOT=yes
BOOTPROTO=dhcp
```

SuSE

Edit the file **/etc/rc.config**; search for the variables **NETCONFIG**, **NETDEV_0**, and **IFCONFIG_0**.

Set them as follows (see the instructions in **rc.config**):

```
NETCONFIG="_0"
NETDEV_0="eth0"
IFCONFIG_0="dhcpclient"
```

Reboot with this command: **/sbin/shutdown -r now**.

Debian

Add this line to the **file /etc/network/interfaces**:

```
iface eth0 inet dhcp
```

Reboot with this command: **/sbin/shutdown -r now**.

Windows TCP/IP Settings

How you configure your Windows computer's network settings differs, depending on your operating system. Go to the section that corresponds to your Window's operating system.

Note:
If you are using a Windows computer, you do not have to configure the TCP/IP settings. This is because your Windows computer will automatically configure them for you. Only Windows users who are troubleshooting the X6 will need to verify the TCP/IP settings.

Windows XP

1. Open the **Internet Protocol (TCP/IP) Properties** dialog box.

   a. From the desktop, click the **Start** button, point to **Control Pane**l, and then click **Network and Internet Connections**.

   b. Right-click the **Local Area Connection** icon, and select **Properties**.

   c. Select your NIC card's TCP/IP entry (it should include **TCP/IP** in it, but not **AOL**, **Dial-up**, or **Adapter**) and click the **Properties** button.

2. Ensure the following is selected, depending on whether you are using dynamic (DHCP) or static IP addressing:

   - If you are using DHCP (most users): Ensure that **Obtain an IP address automatically** is selected and that either **Obtain a DNS server address automatically** or **Enable DNS** is selected. All fields should be blank.

- If you are using a static IP address: Ensure that **Use the following IP address** and **Use the following DNS server addresses** are selected and that the correct **IP address**, **Subnet mask**, **Default gateway**, and **Preferred DNS server** values appear.

Windows 2000

1. Open the **Internet Protocol (TCP/IP) Properties** dialog box.

   a. From the desktop, click the **Start** button, point to **Settings**, then **Network and Dial-up Connections**.

   b. Right-click the **Local Area Connection** icon, and select **Properties**.

   c. Select your NIC card's **TCP/IP** entry (it should include TCP/IP in it, but not AOL, Dial-up, or Adapter) and click the **Properties** button.

2. Ensure the following is selected, depending on whether you are using dynamic (DHCP) or static IP addressing:

   - If you are using DHCP (most users): Ensure that **Obtain an IP address automatically** is selected and that either **Obtain a DNS server address automatically** or **Enable DNS** is selected. All fields should be blank.
   - If you are using a static IP address: Ensure that **Use the following IP address** and **Use the following DNS server addresses** are selected and that the correct **IP address**, **Subnet mask**, **Default gateway**, and **Preferred DNS server** values appear.

Windows 98/Me

1 Open the **Internet Protocol (TCP/IP) Properties** dialog box.

a From the desktop, click the **Start** button, point to **Settings**, then **Control Panel**.

b Double-click the **Network** icon to display the **Network** dialog box.

c Select your NIC card's TCP/IP entry (it should include TCP/IP in it, but not AOL, Dial-up, or Adapter) and click the **Properties** button and then click **OK.**

2 Ensure the following is selected, depending on whether you are using dynamic (DHCP) or static IP addressing:

- If you are using DHCP (most users): Ensure that **Obtain an IP address automatically** is selected and that either **Obtain a DNS server address automatically** or **Enable DNS** is selected. All fields should be blank.
- If you are using a static IP address: Ensure that **Specify an IP address** is selected and that the correct **IP Address** and **Subnet Mask** values appear. On the **DNS Configuration** tab, ensure that **Enable DNS** is selected and that something appears in the **Host** box. (If not, enter any name, word, or combination of letters and numbers.) Ensure that the **DNS Server Search Order** box contains either **10.0.0.2** or **10.0.0.3**.

Appendix D
Troubleshooting

The following are some problems you may experience and some possible solutions to remedy the situation.

Problem

My X6's **ADSL** light continually blinks and does not stay solidly lit.

Solution

There are several issues that could cause this problem. Check these items:

- Ensure that the phone cord is firmly plugged into the wall jack and the **ADSL** jack on the back of the X6 (not the **PHONE** jack on the back of the modem).
- Verify that the jack the phone cord is connected to is enabled for ADSL service. Check with your service provider.
- Your phone cord may be defective. Replace the phone cord with a known good one.
- Check that you have phone filters on all the phones and fax machines using the same ADSL line as the X6. These devices can produce noise and interfere with your ADSL connection when they are off-hook.

Problem

My X6's **ADSL** light is solidly lit, but I cannot connect to the Internet.

Solution

There are several issues that could cause this problem. Check these items:

- Ensure that you are using the correct **VPI**, **VCI**, and **Encapsulation** settings. See Appendix A on page 93.
- If your **Encapsulation** begins with **PPP**, ensure that you have typed your ADSL Username and Password correctly. (Note that this is NOT the username and password you used to log into the **Zoom Configuration Manager** on page 12.)
  - If you had the modem automatically configure its settings, open the **Basic Setup** page, and ensure that **MANUAL** is selected, and then select **7** from the **Virtual Circuit** drop-down list. When the screen changes to show the automatic configuration settings, select **MANUAL** again, then enter the correct **Username** and **Password** in the boxes provided. Click **Save Changes** and **Write Settings to Flash**.
  - If you manually configured your modem, open the **Basic Setup** page, ensure that **MANUAL** is selected, and then enter the correct **Username** and **Password** in the boxes provided. Click **Save Changes** and **Write Settings to Flash**.
- Verify that your service provider's ADSL connection is functioning properly. (Place a call to your service provider's customer support department to verify this.)
- Windows users only: Verify that the Web browser on the computer on which you installed the software is configured for a **network connection** (this might be called a **Local Area Network** or **broadband** connection). If you need help configuring your Web browser, refer to **Appendix E: Configuring Your Web Browser** on page 112.

- Verify that your TCP/IP network settings are properly configured on your computer. To do this, refer to the appropriate section.
  - If you are using Macintosh, see **Macintosh TCP/IP Settings** on page 100.
  - If you are using Linux, see **Linux TCP/IP Settings** on page 102.
  - If you are using Windows, see **Windows TCP/IP Settings** on page 103.

Problem

I cannot log into the **Zoom Configuration Manager**. I have typed **http://10.0.0.2**, but I am not prompted for a User Name and Password.

Solution

There are several issues that could cause this problem. Check these items:

- If you are using a Macintosh or Linux computer, your TCP/IP settings may not be properly configured. See page 99 for more information.
- If you are using Mac OS X 10.3 and above, renew your IP address: Point to **System Preferences**, then choose **Network**. Click the **Configure** button and then the **Renew DHCP Lease** button.
- If you are using a Windows computer, perform a Release/Renew operation:
  - **Windows 2000/XP:** From the desktop, click the **Start** button, then point to **Programs**, point to **Accessories**, and then select **Command Prompt**. Type **ipconfig /all** and press the **Enter** key on your keyboard. In the subsequent dialog box, make sure the **NIC adapter** is highlighted in the drop-down list, click **Renew**, and then click **Release**. Then type **10.0.0.2** into your browser's address bar, and the **Network Password** box should display.
  - **For Windows 95/98/Me:** From the desktop, click the **Start** button and the point to **Run**. Type **winipcfg**, and click **OK**. In the subsequent dialog box, make sure the NIC adapter is highlighted in the drop-down list, click **Renew**, and then click **Release**. Then type **10.0.02** into your browser's address bar, and the **Network Password** box should display.

Problem

The computer on which I installed the X6 software is connected to the Web, but one or more of the additional computers I have connected directly to the modem cannot access the Internet.

Solution

There are several issues that could cause this problem. Check these items:

- Check that there's a good connection between an X6 LAN port and the computer that can't access the Internet.
- Try rebooting the computer that can't access the Internet. This will allow for the computer to release and renew its IP address.
- Try the following for any computer that can't access the Internet: Ensure that the computer is connected using its Ethernet port and one of the X6 modem's LAN ports. Run the installation CD (as explained in **Installing the Software** on page 9), reboot the computer, and then try to connect to a familiar Web address to ensure that the Internet connection is made.

Problem

The computer on which I installed the X6 software is connected to the Web, but the computers connected through my network device (such as a wireless access point, router, hub, or switch) cannot access the Internet.

Solution

The problem is most likely with your network device (such as a wireless access point, router, hub, or switch). Check these items:

- Try rebooting each computer on your network. For example, if you are using a router, reboot each computer that is connected to the router. This will allow for the computers to release and renew their IP addresses.
- If you are using a wireless access point or a router, verify that the device is using Dynamic Host Configuration Protocol (DHCP). This is also known as dynamic IP addressing. Depending on your device, this may be controlled by an **Obtain an IP address automatically** option. If you need help, refer to the documentation that came with your network device or contact its manufacturer.
- Refer to the documentation provided with your network device or contact its manufacturer for assistance.

Appendix E
Configuring Your Web Browser

Important!
This section is for Windows computers only. If you are using a Macintosh or Linux computer, your browser is already configured properly. However, you must ensure that your computer's TCP/IP settings are configured properly. See **Macintosh TCP/IP Settings** on page 100 or **Linux TCP/IP Settings** on page 102 for instructions on how to do this.

When using a Windows computer, the software that you use to make an Internet connection must be set for a **network connection**, not a **dial-up connection**. This configuration should have been done automatically when you installed the software.

If you find that you need to configure your Web browser, this section includes instructions for recent versions of two popular Web browsers: Internet Explorer Version 5.0 (or later) and Netscape Navigator Version 7.2. The configuration is done on the same computer on which you installed the X6 software.

Depending on the browser you have on your Windows computer, follow the corresponding instructions in this section.

Tip:
If you are using an earlier version of one of these browsers, the configuration may be slightly different from below. In those cases—or if you are using another browser altogether—configure the browser to use a **network connection** (this might be called a **Local Area Network** or **broadband** connection).

Configuring Internet Explorer

The following instructions are for Internet Explorer Version 5.0 or later. (If you do not have this version, you can get a free upgrade from Microsoft Corp. If you are not sure what version you have, open Internet Explorer and from the **Help** menu, choose **About Internet Explorer**. The version number is directly below the Microsoft Internet Explorer logo. You can ignore all the numbers after the period following the first digit.)

1 On the desktop, right-click the **Internet Explorer** icon, and select **Properties**.

> **Tip:**
> If you cannot access Internet Explorer in this way, open your computer's **Control Panel** (click the **Start** button and then, depending on your computer, either click **Control Panel**, or click **Settings** and then **Control Panel**). In the **Control Panel**, double-click the **Internet Options** icon. If this icon does not appear, double-click the **Network and Internet Options** icon and then double-click the **Internet Options** icon.

2 On the **Internet Properties** dialog box, select the **Connections** tab, then click the **Setup** button.

3 The setup process will proceed differently, depending on your operating system. The following table details the process for your Windows computer.

Windows XP	Windows 98/Me/2000
a. On the **Welcome to the New Connection Wizard** dialog box, click **Next**. (If you see a **Location Information** dialog box, click **Cancel** and then when asked if you are sure you want to cancel, click **Yes** to return to the **Welcome** dialog box.) b. On the **Network Connection Type** dialog	a. On the **Internet Connection Wizard** dialog box, select **I want to set up my Internet connection manually, or I want to connect through a local area network (LAN)**, then click **Next**. b. On the **Setting up your Internet connection** dialog box, select **I**

box, select **Connect to the Internet**, then click **Next**.

c. On the **Getting Ready** dialog box, select **Set up my connection manually**, then click **Next**.

d. On the **Internet Connection** dialog box, select **Connect using a broadband connection that is always on**, then click **Next**.

e. On the **Completing the New Connection Wizard** dialog box, click **Finish**.

connect through a local area network (LAN), then click **Next**.

c. On the **Local area network Internet configuration** dialog box, uncheck the **Automatic discovery of proxy server** check box then click **Next**.

d. On the **Set Up Your Internet Mail Account** dialog box select **No**, then click **Next**.

e. On the **Completing the New Connection Wizard** dialog box, uncheck the **To connect to the Internet immediately, select this box…** check box (if it appears) and click **Finish**.

4 If you accessed Internet Explorer's settings from the **Control Panel** (as explained in the **Tip** following step 1), the **Control Panel** window will still be open. Close it before continuing.

Configuring Netscape Navigator

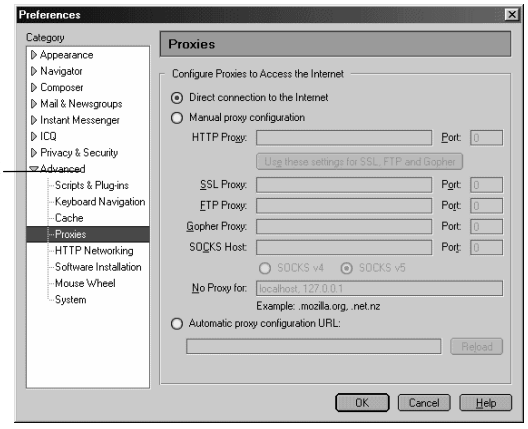
The following instructions are for Netscape Navigator Version 7.2. (If you do not have Version 7.2, you can get a free upgrade from Netscape Communication Corp. If you are not sure what version you have, open Netscape Navigator and from the **Help** menu, choose **About Netscape**. The version number is at the top of the screen.)

1 Double-click the **Netscape Navigator** icon on your desktop to open the browser.

2 From the **Edit** menu, choose **Preferences** to open the **Preferences** dialog box.

3 In the **Category** list, click the triangle to the left of **Advanced** to display a list of choices below it, then select **Proxies**. The **Preferences** dialog box changes to show the Proxies you can specify.

When you click this triangle, more options appear below **Advanced**.



4 Select **Direct connection to the Internet**, then click **OK**.

Appendix F
Wireless Channels by Country

For most countries channels 1-13 are normal for private wireless networks. The following table shows countries known to use channels other than 1-13 for private wireless networks.

Country	Channels
France	10-13
Israel	4-9
Japan	1-13 14 (802.11b only)
Taiwan	1-11
USA	1-11

Appendix G
Regulatory Information

U.S. FCC Part 68 Statement

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. The unit bears a label on the back which contains among other information a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

This equipment uses the following standard jack types for network connection: RJ11C.

This equipment contains an FCC compliant modular jack. It is designed to be connected to the telephone network or premises wiring using compatible modular plugs and cabling which comply with the requirements of FCC Part 68 rules.

The Ringer Equivalence Number, or REN, is used to determine the number of devices which may be connected to the telephone line. An excessive REN may cause the equipment to not ring in response to an incoming call. In most areas, the sum of the RENs of all equipment on a line should not exceed five (5.0).

In the unlikely event that this equipment causes harm to the telephone network, the telephone company can temporarily disconnect your service. The telephone company will try to warn you in advance of any such disconnection, but if advance notice isn't practical, it may disconnect the service first and notify you as soon as possible afterwards. In the event such a disconnection is deemed necessary, you will be advised of your right to file a complaint with the FCC.

From time to time, the telephone company may make changes in its facilities, equipment, or operations which could affect the operation of this equipment. If this occurs, the telephone company is required to provide you with advance notice so you can make the modifications necessary to obtain uninterrupted service.

There are no user serviceable components within this equipment. See Warranty flyer for repair or warranty information.

It shall be unlawful for any person within the United States to use a computer or other electronic device to send any message via a telephone facsimile unless such message clearly contains, in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business, other entity, or individual sending the message and the telephone number of the sending machine or of such business, other entity, or individual. The telephone number provided may not be a 900 number or any other number for which charges exceed local or long distance transmission charges. Telephone facsimile machines manufactured on and after December 20, 1992, must clearly mark such identifying information on each transmitted message. Facsimile modem boards manufactured on and after December 13, 1995, must comply with the requirements of this section.

This equipment cannot be used on public coin phone service provided by the telephone company. Connection to Party Line Service is subject to state tariffs. Contact your state public utility commission, public service commission, or corporation commission for more information.

U.S. FCC Part 15 Emissions Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Industry Canada Emissions Statement

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Industry Canada CS03 Statement

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing the equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of concern. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas. Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Notice: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Electrostatic Discharge Statement

The unit may require resetting after a severe electrostatic discharge event.

Safety Notices

CAUTION: To reduce the risk of fire, use only the supplied phone cord or a No.26 AWG or larger UL Listed or CSA Certified Telecommunication Line Cord.

Do not use this product near water, for example, in a wet basement or near a swimming pool. Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.

Additional compliance information is located on the CD.

Declaration of Conformity

Declaration of Conformity
Conformiteitsverklaring van de EU
Konformitätserklärung
Dichiarazione di conformità
Declaração de Conformidade
Konformitetsdeklaration
Overensstemmelseserklæring
Déclaration de conformité
Δήλωση Συμμόρφωσης
Deklaracja zgodności
Declaración de conformidad
Cam kết về sự tuân thủ ở Châu Âu

Manufacturer/Producent/Fabrikant/ Constructeur/Hersteller/Κατασκευαστής/Fabbricante/ Fabricante/Tillverkare/Nhà sản xuất	**Zoom Technologies, Inc. 207 South Street Boston, MA 02111 USA / 617-423-1072 www.zoom.com**
Brand/Varemærke/Merk/Marque/Marke/Μάρκα/ Marchio/Marka/Marca/ Thương hiệu	**Zoom DSL/ADSL X6 Router/Modem**
Type/Typ/Μάρκα/Tipo/Kiểu mẫu	**Series 1046 Models 5590, 5591**

The manufacturer declares under sole responsibility that this equipment is compliant to Directive 1999/5/EC via the following. This product is CE marked.

Producenten erklærer under eneansvar, at dette udstyr er i overensstemmelse med direktivet 1999/5/EC via følgende. Dette produkt er CE-mærket.

De fabrikant verklaart geheel onder eigen verantwoordelijkheid dat deze apparatuur voldoet aan Richtlijn 1999/5/ EC op grond van het onderstaande. Dit product is voorzien van de CE-markering.

Le constructeur déclare sous son entière responsabilité que ce matériel est conforme à la Directive 1999/5/EC via les documents ci-dessous. Ce produit a reçu le marquage CE.

Hiermit erklärt Zoom die Übereinstimmung des Gerätes modem mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EC. Dieses Produkt ist das gekennzeichnete CE.

Ο κατασκευαστής δηλώνει με αποκλειστική του ευθύνη ότι αυτό το προϊόν συμμορφώνεται με την Οδηγία 1999/5/EC μέσω των παρακάτω. Αυτό το προϊόν φέρει τη Σήμανση CE.

Il fornitore dichiara sotto la sola responsabilità che questa apparecchiatura è compliant a 1999/5/EC direttivo via quanto segue. Questo prodotto è CE contrassegnato.

Producent stwierdza że to urządzenie zostało wyprodukowane zgodnie z Dyrektywą 1999/5/EC. Jest to potwierdzone poprzez umieszczenie znaku CE na urządzeniu.

O fabricante declara sob sua exclusiva responsabilidade que este equipamento está em conformidade com a Directiva 1999/5/EC através do seguinte. Este produto possui Marcação CE.

El fabricante declara bajo su exclusiva responsabilidad que este equipo satisface la Directiva 1999/5/EC por medio de lo siguiente. Este producto tiene marca CE.

Nhà sản xuất cam kết với trách nhiệm của mình là thiết bị này tuân theo Hướng dẫn 1999/5/EC thông qua các mục sau. Sản phẩm này được đánh dấu là CE.

73/23/EEC – LVD	EN60950-1:2001
89/336/EEC – EMC	EN301 489-1 V1.4.1: 2002 EN301 489-17 V1.2.1: 2002 EN55022-1998/A1: 2000 Class B/A2:2003 EN55024:1998/A1: 2001/A2: 2003
1999/5/EC	EN300 328 v1.6.1: 2004

Andy Pollock
14 December, 2006
1046/TF, Boston, MA, USA

Director, Hardware Engineering/Direktør, Hardware Engineering/Director, Sustaining Engineering /Directeur, ingénierie de soutien/Direktør, Sustaining Engineering /Διευθυντής, Μηχανικής Διατήρησης /Direttore, Hardware Engineering /Dyrektor, Inżynieria ciągła/Director, Engenharia de Manutenção /Director, Ingeniería de apoyo/Giám Đốc Kỹ thuật Phần cứng